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Case Report

Efficacy of Long-Term Use of Histamine Antagonists and Mast Cell Membrane Stabilizers in a Patient with Bronchial Asthma. Clinical Case

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Received: October 27, 2026; **Published:** November 10, 2026

DOI: 10.31080/ECPE.2026.15.01731

Abstract

Introduction: The unfavorable trend of an increase in newly diagnosed cases of bronchial asthma (BA) in childhood is a cause for serious concern. As a rule, the atopic form of BA results from the implementation of the atopic march, for which, unfortunately, there are currently no management options.

Aim: To describe the effectiveness of long-term use of histamine antagonists and mast cell membrane stabilizers in a patient with the atopic form of BA.

Case Presentation: A clinical case is presented concerning the long-term use of cetirizine and ketotifen in the treatment of a patient with bronchial asthma, which demonstrated high efficacy. Comprehensive examination allowed for the verification of the diagnosis: (ICD-10) Bronchial asthma, atopic, moderate, controlled course (J45). Seasonal allergic rhinitis (J30). Food allergy, gastrointestinal form (allergic gastroenteritis/colitis), associated with sensitization to chicken and pork meat (K52.2). Intestinal dysbiosis, stage II, associated with UPM (*Staphylococcus aureus* - 10^5 CFU/g, *Klebsiella pneumoniae* - 10^6 CFU/g, *Klebsiella oxytoca* - 10^5 CFU/g).

Results: Considering the severity of the disease and the lack of effect from basic therapy, the patient was offered a therapeutic course of cetirizine at a dose of 10 mg once daily for up to 30 days and ketotifen 0.5 mg twice daily for up to 30 days, alternately over a period of 18 months. A multidisciplinary approach to therapy made it possible to achieve long-term clinical and laboratory remission with no respiratory symptoms up to the present time (20 years).

Conclusion: The use of a long-term course of a second-generation H1-histamine receptor blocker - cetirizine - and a mast cell membrane stabilizer with moderate H1-histamine blocking activity - ketotifen - in children with the atopic form of asthma is quite reasonable and justified in cases where inhaled glucocorticosteroids prove ineffective.

Keywords: *Bronchial Asthma; Cetirizine; Ketotifen; Bacteriophages; Eosinophils; Atopy*

Abbreviations

BA: Bronchial Asthma; ECP: Eosinophil Cationic Protein; IgE: Immunoglobulin E; ARVI: Acute Respiratory Viral Infections; EOS: Eosinophils; BOS: Broncho-Obstructive Syndrome; ICD-10: International Classification of Diseases, 10th Revision

Introduction

In recent decades, one of the global challenges in the field of health is the steady increase in the number of allergic diseases. Allergy, one of the most common medical and social problems, showing a stable tendency to increase the number of cases every year, is an intractable task that requires an extraordinary approach [1]. One of the most common nosological forms of allergy according to the ICD-10 classification criteria (J45 codes) is AD. Today, asthma is considered as a heterogeneous disease, characterized by chronic inflammation of the respiratory tract, the hallmark of which is variable in duration and intensity respiratory symptoms of wheezing, shortness of breath, chest tightness and cough in combination with labile expiratory airflow [2]. Asthma is one of the main diseases that can significantly limit the scope of human social activity. According to the international group of experts Global Initiative for Asthma, GINA 2025 has exceeded 350 million patients with a verified diagnosis of asthma and continues to increase, despite the active use of drugs for both basic and targeted therapy [3]. The features of the epidemiology of asthma are different in children and adult patients, according to data (GINA 2025), it ranges from 1 to 18% in the pediatric population of different countries, and is inextricably linked with the patterns of development of the atopic march [4].

The heterogeneity of asthma itself creates problems of lack of control of the course of the disease. Uncontrolled, irreversible airway remodeling, which is a key sign of asthma, caused by total damage to the epithelium of the terminal parts of the bronchial tree, leads to an irreversible process of impaired mucosal architectonics [5]. The main starting pattern of pathomorphological changes in the bronchi is hyperplasia and metaplasia of epithelial cells and cuboid exocrinocytes of the bronchial epithelium, smooth muscle hypertrophy with the subsequent collagen deposition process, which leads to the occurrence of subepithelial fibrosis. Dyskinesia of the ciliated epithelium caused by extensive mucosal damage is one of the factors of active hyperproduction of mucus and the formation of mucous plugs, without persistent smooth muscle hypertrophy, the condition is characteristic of childhood BA and is usually a reversible process [6].

The search for methods capable not only of predicting structural changes occurring in the bronchial tree, but also of stopping the progressive development of the pathological process is currently relevant. It is very important to understand that in the absence of mechanisms for controlling the atopic march in children, attempts to influence the pathomorphological processes of already verified BA are in demand [7].

In accordance with the understanding of the modern concept of AD etiopathogenesis, this is a polyfactorial non-infectious disease due to the relationship of the genetic component and environmental trigger factors. AD heterogeneity is represented by different pheno and endotypes of the disease, many of which can be distinguished in daily clinical practice. Today, one of the most common is the allergic phenotype of BA, which is associated with hereditary burden and the natural, unfortunately, uncontrolled course of the atopic march [8]. Being one of the most common and most studied types of asthma, the eosinophilic endotype is due to the Th2 profile of the immune response to the action of environmental allergens in patients with a hereditary predisposition to atopy, where eosinophils are one of the key effector cells.

The effector functions of eosinophilic granulocytes are the ability during degranulation to release cationic proteins stored in their cytoplasmic granules (MBP, ECP, EPO, EDN), auxiliary (cysteinyl leukotrienes LTD4 - LTE4, leukotriene V4, prostaglandin D2, etc.), cytokines, chemokines, growth factors, etc., which can cause destruction and desquamation of the bronchial mucosal epithelium, increase vascular permeability and cause mast cell degranulation [9,10]. The signal to effector cells received after contact with the trigger factor leads to the activation of Th2 cells together with ILC2, which in turn produce type 2 cytokines IL-4, IL-5, IL-9, IL-13, stimulate the production of

IgE and AREG, which provoke degranulation with the release of profibrotic cytokines TGF- β, PDGG F and IL-13. The cascade of the above reactions leads to sustained inflammation and hyperplasia of bronchial tree epithelial cells. Activation of profibrotic cytokines promotes the transformation of fibroblast into myofibroblast, which is a factor in the production of collagen types I, III, IV, VIII [11,12].

The current strategy for controlling allergic asthma is based on the recommendations of GINA experts and includes drug therapy, lifestyle optimization, elimination of triggers, and patient education on self-control methods [13]. Asthma of an adult patient associated with the T2 endotype in most cases is the result of the implementation of the atopic march in children with a hereditary predisposition to atopy, requiring an exclusively personalized approach. In accordance with the recommendations of GINA-2025, beta-2 adrenergic agonists, corticosteroids, leukotriene modifiers, monoclonal antibodies to immunoglobulin E. Today, allergen-specific immunotherapy (ASIT) remains the only pathogenetic therapy for allergic asthma, including the one actively used in children from 5 years old sublingual form of ASIT (SLIT). Unfortunately, despite the widespread introduction of modern methods of pharmacotherapy of asthma, the level of disease control remains insufficient. Modern generation of GINA-2025 recommends that the primary care physician, if possible, refrain from the routine use of the prescription algorithm and switch to adaptive, personalized therapy, taking into account the clinical picture of the disease. The GINA-2025 recommendations aimed at active stratification of patients and supplementing the main diagnostic screening of asthma with indicators of inflammatory activity, for example, the level of fractional nitric oxide in the exhaled air or eosinophils in peripheral blood, are quite justified [14,15].

As a successful application of a personalized approach to the therapy of a patient with an allergic form of asthma based on dynamic observation and controlled control of the level of eosinophils and the product of their degranulation of eosinophilic cationic protein (ECP), the concentration of total and allergen-specific IgE, a clinical case from the practice of the outpatient department of the Clinic of Allergology and Immunology is presented, demonstrating high clinical effectiveness.

Case Report

Accompanied by her mother, patient E., 5 years old, presented to the outpatient department of the Clinic of Allergology and Immunology, on the date of initial presentation - 10.10.2006, with complaints of periodic shortness of breath arising during physical exertion and during the course of ARVI, periodic nasal congestion, skin rashes during the consumption of confectionery, vegetables and fruits. From the anamnesis it became known that the girl was born from the first pregnancy, which occurred against the background of controlled BA, histational anemia, ARVI at 24 weeks of pregnancy, the first urgent, rapid birth weighing 3200g, chest circumference 33 cm, head circumference 34 cm. Apgar score 8/9 points. Diagnosis at birth: Full-term girl, risk group for hearing loss. Screening study of peripheral blood on the first day (reference range); erythrocytes - 6.59×10^{12} (5.0-7.0), hemoglobin 243 g/L (180-240), leukocytes - 20.0×10^{9} (8.5-24.5), eosinophils - 3% (0.5-6), neutrophils: rod-nuclei - 6 (1-17), segmented - 65 (45-80), lymphocytes - 19 (12-36), monocytes 7 (2-12). Attached to the chest on the first day, sucked actively. Diagnosis at discharge from the maternity hospital: Healthy girl. Care and feeding recommendations.

History during the first year of life: the girl is exclusively breastfed for up to 4 months, apple and carrot juice is recommended for use for 1 month. According to my mother, intensive intestinal colic, erythematous rash on the face, pathological inclusions in the stool in the form of mucus and greens, the frequency of defecation 2 once every 1 day debuted 2-3 months. Stool culture with bacteria identification and antibiotic+bacteriophage susceptibility testing not carried out. At the 2nd year of life, grade I hypochromic iron deficiency anemia was diagnosed. At the 3rd year of life, the diagnosis was verified: Allergic rhinitis. Peripheral blood test at the time of verification from 28.02.2003 erythrocytes - 3.50×10^{12} (3.5-4.5), hemoglobin 116 g/L (110-140), color indicator - 0.9 (0.85-1.15) leukocytes - 7.4×10^{9} (5-12), eosinophils - 12% (0.5-7), neutrophils: rod-nuclei - 1 (0.5-5), segmented - 43 (25-60), lymphocytes - 39 (26-60), monocytes - 5 (2-10). ESR 5 mm/h (4-12). In 2003.18.06 the patient first comes with complaints of difficulty breathing in the somatic department of the city children's hospital. In 2004. BA was verified, basic therapy with Fluconazole 125 mg/d was recommended.

Prior to contacting the outpatient department of the Clinic of Allergology and Immunology from the moment of BA verification and prescription of basic therapy Fluconazole 125 mg/d. (over 2 years), the patient had 7 cases of hospitalization in the children's somatic department associated with bronchial obstruction (SPM) and 6 episodes of SPM therapy in the outpatient department.

In accordance with the protocol for the management of patients with an allergo-immunological profile, the following studies were conducted: Complete blood count with WBC and ESR: RBC 5.2 × 10^{12}/L, HGB 114 g/L, WBC 9.0 × 10^{9}/L, PLT 178 × 10^{9}/L, NEU 44%, EOS 12%, BAS 0%, LYM 40%, MON - 4%, ESR - 6 mm/h. Blood chemistry: total protein - 63 g/L, alanine aminotransferase - 14.3 U/L, aspartate aminotransferase - 12.7 U/L, alkaline phosphatase - 210 U/L, total bilirubin - 21 μmol/L, urea - 4.8 mmol/L, creatinine - 45.0 mmol/L, glucose - 4.3 mmol/L. IgE total - 743.25 IU/mL. Eosinophilic cationic protein (ECP) - 28 ng/mL, sIgE (ImmunoCAP): D farina - 2.51 kU/L, cat epithelium - 4.74 kU/L, dog dandruff - 2.04, alder 0.48 kU A/l, warty birch - 7.84 kUA/l, mixed meadow herbs - 5.34 kUA/l, chicken meat - 71 mg/l, pork - 58 mg/l. Coprogramme: viscous consistency, yellow-green color, sour smell, pH - 7.0, mucus in small quantities, soluble protein absent, stercobilin, feces detritus, neutral fat, fatty acids, soap in small quantities, ammonia, muscle, connective-woven wolves on, starch, vegetable fiber absent, red blood cells - 4-6 in p/s, leukocytes - 2-4 per p/s. Fecal calprotectin - 569 μg/g. Stool Culture with bacteria identification and antibiotic+bacteriophage susceptibility testing: *Staphylococcus aureus* - 10^{5} CFU/g, *Klebsiella pneumoniae* - 10^{6} CFU/g. *Klebsiella oxytoca* 10^{5} CFU/g. Urinalysis - age norm. Diagnosis was made: (ICD 10) Bronchial asthma, atopic form, mild persistent course, controlled with sensitization to (D farina, cat epithelium, dog dandruff) (J45). Persistent allergic rhinitis, established sensitization spectrum (alder, warty birch, meadow grass mixed) (J30). Gastrointestinal food allergy with sensitization to (chicken meat, pork).

According to the results of stool culture with bacteria identification and antibiotic+bacteriophage susceptibility testing, phage therapy was performed to decontaminate the association of *Staphylococcus aureus*, *Klebsiella pneumoniae* and *Klebsiella oxytoca* followed by control at the first control point - 6 months. The level of lg CFU/g corresponded to *Staphylococcus aureus* - 10^{3} CFU/g, *Klebsiella pneumoniae* - 10^{3} CFU/g. *Klebsiella oxytoca* - no growth. Given the nature of the disease, the lack of the desired clinical effect from the basic therapy, within 2 years after verification, the patient had 7 cases of hospitalization in the inpatient department and 6 episodes of BPS therapy in the conditions of the city children's clinic. In addition, due to the high anxiety of the mother associated with the use of inhaled corticosteroids, significantly affecting compliance, it was decided to initiate a therapeutic course of cetirizine at a dose of 10 mg 1 once a day up to 30 days and ketotifen 0, 5 mg 2 times a day up to 30 days alternately, then a break for 30 days - for 18 months, at the same time at the beginning of therapy, the patient was prescribed Rus 0.2 ml. IM 1 once a week for 10 weeks with monitoring of the dynamics of a complete blood count with a leukocyte formula, IgE total and ECP every 6 months (Table 1) [16-20].

Checkpoints	**6 months**	**12 months**	**18 months**	**24 months**	**30 months**	**36 months**	**42 months**	**48 months**
Episodes of obstruction	On the back-ground of ARVI	-	On the back-ground of ARVI	-	-	-	-	-
Laboratory indicators								
Eosinophils (%)	9	7	11	6	7	4	3	4
Total IgE (IU/ml)	574	228	171	106	67	37	71	34
Eosinophil cationic protein (ng/ml)	22	18	16	16	12	14	13	9

Table 1: *Dynamics of clinical and paraclinical indicators of the patient during treatment with cetirizine and ketotifen.*

Already at the first control point in 6 months, we managed to achieve not significant, but positive dynamics of EOS, IgE total and ECP indicators against the background of the therapy with cetirizine and ketotifen offered to the patient. Over the past 6 months, against the background of the course of ARVI, one BOS was registered, which was stopped by ICS using a nebulizer. Further observation of the patient convinced us of the correct choice of the proposed therapy. In the second year of follow-up (3rd control point, 18 months), the most recent SPM provoked by spring pollination was diagnosed and an important effect of 18 months of therapy was obtained to achieve the reference level of EOS, IgE total. It is important to note that within 4 years from the start of therapy, during the spring polysis, there were manifestations of allergic rhinoconjunctivitis, requiring additional drug correction. Currently, the patient is fully socialized, has a higher education and works in the tourism business.

Discussion

The presented clinical case of long-term use of cetirizine and ketotifen in the therapy of a patient with asthma demonstrated high efficacy, which affected not only the positive clinical symptoms, but also the favorable dynamics of the main clinical biomarkers of the disease. During the treatment and follow-up of the patient, we implemented a multidisciplinary approach, which included, in addition to the correction of biomarkers of the allergic nature of the disease, the process of formation of the intestinal microbiota - decontamination of excessive growth of the association of *Staphylococcus aureus, Klebsiella pneumoniae* and *Klebsiella oxytoca*. Throughout the follow-up of the patient, a nutrition algorithm was formed, including the principles, regimen and diet in accordance with federal clinical recommendations, the mechanism of treatment of comorbid and non-comorbid diseases was regulated. The clinical example of the patient, which showed the high effectiveness of oral use of cetirizine and ketotifen in the treatment of AD, certainly requires further research and may represent a fundamentally new approach to the treatment of patients with allergic form of AD.

Conclusion

A multidisciplinary approach to therapy, the basis of which is the oral use of the second generation H1-blocker of histamine receptors - cetirizine and a mast cell membrane stabilizer with moderate H1-histamine-blocking activity - ketotifen with simultaneous phage correction of the intestinal microbiota in children with atopic AD, is quite reasonable, as evidenced by the presented clinical example. Low-cost, non-invasive clinical biomarkers of EOS, IgE total and ECP disease are representative enough to control disease dynamics.

At the beginning of the research work, a written informed voluntary consent was received from the legal representative of the child (mother) for long-term therapy (date of signing (10/10/2006) and before starting work on the manuscript, the patient received a written informed voluntary consent to publish a description of the clinical case, medical data (results of clinical examinations, laboratory data, treatment and dynamic observation) in a medical journal, including its electronic version (date of signing 20.01.2026).

Authors' Participation

Authors declare their authorship to meet the international ICMJE criteria. S.F. Gladkov - Creation of the concept, search and analysis of literature, statistical processing of results, writing the text of the article; N.K. Perevoshchikova - Approval of the final version of the article. All co-authors - approval of the final version of the article, responsibility for the integrity of all parts of the article.

Funding Support

The study had no financial support.

Conflict of Interest

The authors declare no conflict of interest.

Acknowledgments

The team of authors sincerely appreciates help of English teacher (Secondary Comprehensive School 64 Penza) Avdonina Ekaterina Alexandrovna for the translation of the manuscript into English and language editing.

Bibliography

1. Alska E., *et al.* "Global burden of allergies: mechanisms of development, challenges in diagnosis, and treatment". *Life* 15.6 (2025): 878.
2. Global Initiative for Asthma. "Global strategy for asthma management and prevention (2025 update)" (2025).
3. Kurbacheva OM., *et al.* "Current aspects of allergen-specific immunotherapy in patients with bronchial asthma: a review of GINA 2024 updates and EfficAPSI study results". *Russian Journal of Allergology* 22.2 (2025): 195-206.
4. Venkatesan P. "2025 GINA report for asthma". *The Lancet Respiratory Medicine* 13 (2025): e42.
5. Savin IA., *et al.* "Bronchial asthma, airway remodeling, and lung fibrosis as consecutive stages of a single process". *International Journal of Molecular Sciences* 24.22 (2023): 16042.
6. Alvarez CA., *et al.* "Acute and chronic lung inflammation drives changes in epithelial glycans". *Frontiers in Immunology* 14 (2023): 1167908.
7. Wang X., *et al.* "Association between exposure to greenness and atopic march in children and adults—a systematic review and meta-analysis". *Frontiers in Public Health* 10 (2023): 1097486.
8. Byalovsky YY., *et al.* "Pathogenetic aspects of bronchial asthma phenotyping". *I.P. Pavlov Russian Medical Biological Herald* 32.1 (2024): 145-158.
9. Prilutsky AS., *et al.* "Eosinophils in health and disease. Structure, mediators, development". *Allergology and Immunology in Pediatrics* 1 (2023): 5-15.
10. Kay AB., *et al.* "The role for eosinophils in airway remodelling in asthma". *Trends in Immunology* 25.9 (2004): 477-482.
11. Iwata A., *et al.* "Group 2 innate lymphoid cells in human asthma". *Allergology International* 72.2 (2023): 194-200.
12. Dong X., *et al.* "Involvement and therapeutic implications of airway epithelial barrier dysfunction in type 2 inflammation of asthma". *Chinese Medical Journal* 135.5 (2022): 519-531.
13. Denisova AR., *et al.* "Verification of diagnosis and routing of children with bronchial asthma using modern capabilities of information systems". *Russian Journal of Allergology* 20.4 (2023): 512-520.
14. Skorokhodkina OV., *et al.* "Cytokines as biomarkers of eosinophilic inflammation in the T2-endotype of bronchial asthma". *The Bulletin of Contemporary Clinical Medicine* 14.6 (2021): 68-75.
15. Ministry of Health of the Russian Federation. "Clinical guidelines: bronchial asthma" (2024).
16. Diepgen TL and Early Treatment of the Atopic Child Study Group. "Long-term treatment with cetirizine of infants with atopic dermatitis: a multi-country, double-blind, randomized, placebo-controlled trial (the ETAC trial) over 18 months". *Pediatric Allergy and Immunology* 13.4 (2002): 278-286.
17. Kondyurina EG., *et al.* "Cetirizine in pediatric practice". *Russian Medical Journal* 2 (2013): 63.

18. Zhou P., *et al.* "Cetirizine for the treatment of allergic diseases in children: a systematic review and meta-analysis". *Frontiers in Pediatrics* 10 (2022): 940213.

19. "Use of cetirizine and levocetirizine in patients with chronic urticaria and other allergic dermatoses: issues of dose escalation and duration of use. Resolution of the expert council". *Effective Pharmacotherapy* 18.25 (2022): 6-14.

20. Schwarzer G., *et al.* "Ketotifen alone or as additional medication for long-term control of asthma and wheeze in children". *Cochrane Database of Systematic Reviews* 2004.1 (2004): CD001384.

Volume 15 Issue 11 November 2026
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