

STRATEGIES FOR PROTECTING RESPIRATORY BARRIERS DURING THE COLD SEASON, OR HOW TO OPTIMIZE THE TREATMENT OF ACUTE BRONCHITIS IN CHILDREN THROUGH MUCOCORRECTION

O. K. Koloskova¹, A. L. Kosakovskiy², K. V. Rudan¹

¹Higher Education Institution "Bukovinian State Medical University", Chernivtsi, Ukraine

²Educational and Scientific Center "Institute of Biology and Medicine" of Taras Shevchenko National University of Kyiv, Kyiv, Ukraine

Abstract. The airway epithelium is a key barrier between the human body and the external environment and plays a central role in protecting the lungs from infectious agents, particularly viruses. An important component of the innate defense of the respiratory tract is mucociliary clearance (MCC), the effectiveness of which depends on the coordinated function of the ciliated epithelium, the physicochemical properties of mucus, and the state of the periciliary fluid layer. Impairment of MCC accompanies most acute and chronic inflammatory airway diseases, promoting mucostasis, microbial colonization, and prolongation of the disease course. One of the modern therapeutic approaches involves the use of inhaled agents aimed at mucus rehydration, reduction of its viscosity, and restoration of the protective properties of the respiratory epithelium.

The aim of this study was to evaluate the clinical efficacy of inhalations of a combined nebulized agent consisting of 3% sodium chloride solution and 0.1% hyaluronic acid in the treatment of children with acute bronchitis.

Methods. A total of 58 children with acute bronchitis (mean age 6.6 ± 0.30 years) were examined in the Pulmonology and Allergology Department of the Chernivtsi Regional Children's Clinical Hospital. Patients were randomized into two groups: Group I (n = 30) received standard therapy combined with inhalations of hypertonic sodium chloride solution with hyaluronic acid, while Group II (n = 28) received standard therapy only. The severity of bronchitis was assessed using the Bronchitis Severity Score (BSS). Treatment efficacy was analyzed from the perspective of clinical epidemiology, including the assessment of absolute and relative risks, odds ratios, and pharmacoeconomic indicators.

Results. The use of a combination of hypertonic sodium chloride solution with hyaluronic acid as part of comprehensive therapy was associated with a faster regression of the main clinical symptoms of acute bronchitis and a statistically significant reduction in the total BSS score. In Group I patients, a reduced risk of symptom persistence, shorter hospital stay, and decreased overall disease duration were observed. The odds ratio for the need for prolonged inpatient treatment in the standard therapy group was 2.6 (95% CI: 1.02–6.38). The mean duration of illness was significantly shorter in children receiving the combination of hypertonic sodium chloride solution with hyaluronic acid (13.6 ± 1.66 vs 18.3 ± 0.68 days; $p < 0.05$). In addition to clinical benefits, the use of the drug was associated with a reduction in direct medical costs.

Conclusions. Inhalations of a combination of hypertonic sodium chloride solution with hyaluronic acid are a safe and effective component of therapy for children with acute bronchitis. The use of this agent promotes restoration of mucociliary clearance, reduction of inflammation, acceleration of recovery, shortening of hospitalization duration, and reduction of pharmacological burden, which substantiates the feasibility of its inclusion in the comprehensive treatment of acute bronchitis in pediatric practice.

Key words: children, acute bronchitis, respiratory barrier protection.

Декларація з етики. У процесі збору, обробки та представлення результатів дослідження було забезпечено дотримання принципів конфіденційності персональних даних пацієнтів. Усі учасники надали добровільну письмову інформовану згоду на використання їхніх даних у науковій публікації.

Конфлікт інтересів. Автори підтверджують відсутність будь-якого потенційного або реального конфлікту інтересів.

Фінансування. Дослідження виконано в межах планової науково-дослідної роботи кафедри педіатрії та дитячих інфекційних хвороб БДМУ «Сучасні епідеміологічні, клініко-параклінічні та діагностичні особливості найбільш поширених запальних захворювань інфекційної та неінфекційної природи у дітей» (01.01.2022–31.12.2026 р.р.) № держреєстрації: 0122U002208.

Ethics Statement. During the collection, processing, and presentation of the study data, the principles of confidentiality of patients' personal information were strictly observed. All participants provided written informed consent for the use of their data in this scientific publication.

Conflict of Interest. The authors declare no actual or potential conflicts of interest.

Funding. This study was conducted within the framework of the planned research project of the Department of Pediatrics and Pediatric Infectious Diseases, Bukovinian State Medical University, entitled "Modern epidemiological, clinical, paraclinical and diagnostic features of the most common inflammatory diseases of infectious and non-infectious origin in children" (January 1, 2022–December 31, 2026), state registration No. 0122U002208.