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MAGNESIUM GLYCINATE: A PROMISING COMPONENT OF COMPLEX THERAPY FOR BRONCHIAL ASTHMA

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According to the definition of the Global Initiative for Asthma (GINA, 2024), bronchial asthma is a heterogeneous disease, usually characterized by chronic airway inflammation [1]. The disease is marked by a history of respiratory symptoms such as wheezing, shortness of breath, chest tightness, and coughing. These manifestations vary in frequency and intensity and are accompanied by variable expiratory airflow limitation. Despite significant advances in understanding the mechanisms of asthma development and the introduction of modern therapeutic approaches—including inhaled corticosteroids (ICS) and long-acting β_2-agonists (LABAs)—a substantial number of patients still experience insufficient disease control. Such patients often suffer from frequent exacerbations, which adversely affect their quality of life and increase the risk of poor outcomes, highlighting the need for additional therapeutic strategies [2].

In recent years, increasing attention has been paid to the role of trace elements in the development and progression of various pathological conditions, including bronchial asthma. According to research data, approximately 70% of the population experiences a significant magnesium deficiency. Magnesium is one of the essential macroelements, involved in numerous physiological processes—from the regulation of smooth muscle tone to immune modulation and anti-inflammatory responses [3]. A lack of magnesium may contribute to increased bronchial hyperreactivity, provoke the development of bronchospasm, and enhance airway inflammation [4].

Long-term use of medications for the treatment of bronchial asthma is often accompanied by the development of tachyphylaxis, i.e., a reduction in drug effectiveness upon repeated administration. Moreover, the use of high doses of long-acting β_2-agonists (LABAs) may lead to adverse effects such as tachycardia, arrhythmia, and headache. In clinical practice, intravenous administration of magnesium sulfate is traditionally used to manage severe asthma attacks in hospitalized patients. However, the efficacy and appropriateness of long-term oral magnesium supplementation for improving disease control and reducing the frequency of exacerbations remain subjects of scientific debate.

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Reduced magnesium levels are closely associated with impaired respiratory system function, making the maintenance of optimal magnesium concentrations critically important for lung health. The beneficial effects of magnesium are mediated through several physiological mechanisms. It acts as a natural calcium antagonist, promoting relaxation of bronchial smooth muscles and reducing the severity of bronchospasm. Additionally, magnesium regulates the release of inflammatory mediators, such as histamine and leukotrienes, thereby exerting anti-inflammatory effects at the airway level.

In recent years, magnesium glycinate has attracted particular attention due to its high bioavailability, safety, and additional neuroregulatory effects. This compound is considered a promising component of comprehensive bronchial asthma therapy, capable of enhancing treatment efficacy, improving symptom control, and reducing the frequency of exacerbations. Furthermore, magnesium glycinate is well tolerated, rarely causes adverse effects, and offers several additional benefits, including improved sleep quality, reduced irritability, and antiarrhythmic properties [5].

Thus, the study of the therapeutic potential of magnesium compounds, particularly magnesium glycinate, represents a relevant direction in optimizing asthma treatment, aimed at increasing therapeutic effectiveness and improving patients' quality of life.

Objective: To evaluate the clinical efficacy of magnesium glycinate in the comprehensive treatment of patients with bronchial asthma.

Materials and Methods: The study included 60 patients diagnosed with moderate bronchial asthma (mean age 51.3 ± 10.4 years), who were randomized into two groups: control and main. The control group (n = 30) received only standard baseline therapy, consisting of inhaled corticosteroids (ICS) in budesonide-equivalent doses ranging from 400 to 1600 µg/day depending on asthma severity and long-acting β_2-agonists (LABAs), salmeterol 50 µg twice daily. The main group (n = 30) received the standard baseline therapy plus magnesium glycinate at a dose of 400 mg orally twice daily for 3 months. Patients in the control group received a placebo identical in appearance to the magnesium glycinate tablets.

All patients underwent spirometry [6], and changes in forced expiratory volume in the first second (FEV_1) as well as the number of exacerbations were evaluated.

Table 1. Dynamics of FEV_1 (L) in the Main and Control Groups

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Group	Baseline FEV1 (L)	FEV1 after 3 months (L)	Δ FEV1 (L)	Δ FEV1 (%)	p-value (within group)	p-value (between groups)
Main group	2.25 ± 0.37	2.46 ± 0.35*	0.4	15.4	< 0.01	0.02
Control group	2.17 ± 0.35	2.20 ± 0.39	0.15	6.0	0.2	

As shown in Table 1, after 3 months of therapy, the main group (patients receiving magnesium glycinate) demonstrated a statistically significant increase in mean FEV_1 by 15.7% from baseline (from 2.25 ± 0.37 L to 2.46 ± 0.35 L; $p < 0.01$). In the control group, the increase in FEV_1 was not statistically significant, amounting to 6.1% (from 2.17 ± 0.35 L to 2.20 ± 0.39 L; $p = 0.18$). Intergroup comparison of FEV_1 changes revealed a statistically significant advantage for the main group ($p = 0.02$).

Number of exacerbations: All episodes of asthma symptom worsening that required unscheduled medical visits, increased use of short-acting β_2-agonists (SABAs) more than 3 times per day for 2 or more days, systemic corticosteroid therapy, or hospitalization were recorded. During the 3-month study period, the main group experienced 5 exacerbations requiring systemic corticosteroids, which is 30.6% fewer than in the control group (9 exacerbations; $p = 0.03$). The proportion of patients experiencing exacerbations was also significantly lower in the main group (30.0% vs. 41.7%; $p = 0.04$). Data on the number of exacerbations in both groups are presented in Table 2.

Table 2. Number of Asthma Exacerbations During the Study Period

Group	Number of patients with exacerbations, n (%)	Total number of exacerbations	Average number of exacerbations per patient	p-value (between groups)
Main group	5 (16.6)	8	0.47	0.03
Control group	9 (30)	16	0.63	

Despite existing therapy standards, a substantial number of patients continue to experience insufficient disease control, highlighting the need for additional therapeutic approaches. According to the scientific literature, magnesium deficiency is associated with increased bronchial reactivity, frequent exacerbations, and reduced efficacy of baseline therapy [7]. The choice of form—magnesium glycinate—also deserves attention due to its high bioavailability and gentle effect on the gastrointestinal tract. Moreover, glycine, a component of the compound,

may exert additional neuromodulatory and anxiolytic effects, which is important for asthma patients who often present with anxiety and depressive disorders.

Thus, the addition of magnesium glycinate at a dose of 400 mg/day to standard baseline therapy in patients with moderate bronchial asthma (main group) represents an effective and safe approach, contributing to improved pulmonary function, reduced frequency of exacerbations, and better disease control.

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