

diagnosis of atypical pneumonia, considering clinical features, laboratory data and imaging findings. Our tasks are to identify the most significant markers for early determination of the signs and symptoms of the disease, conduct a comparative analysis of the diagnostic methods used and to establish the proposed algorithm.

Material and methods. Our study includes 42 patients. All of them were hospitalized in the pulmonary department of the City Clinical Hospital №2 and the Occupational Pathology Center in Dushanbe during the period 2021–2024. The average age of the patients was 37.8 ± 6.4 years. All patients underwent a comprehensive examination, which included complete blood count and biochemical analysis, C-reactive protein (CRP), lactate dehydrogenase (LDH), serological tests (IgM/IgG for *Mycoplasma pneumoniae*, *Chlamydia pneumoniae*, influenza viruses, and SARS-CoV-2), PCR diagnostics, chest X-ray, and computed tomography (CT).

Results of the study. The study identified key early diagnostic indicators of atypical pneumonia: clinical symptoms (dry cough, low-grade fever, myalgia) in 85.7% of patients; elevated LDH/CRP in 71.4%; positive serology (*Mycoplasma* – 14, *Chlamydia* – 5, viral – 12, fungal/pneumocystis – 6); and interstitial CT changes in 76.2%. An early diagnostic algorithm was proposed, including clinical screening, chest X-ray, laboratory markers, CT when indicated, and serology/PCR, with mandatory differentiation from tuberculosis and COVID-19.

Conclusions. The proposed algorithm improves the accuracy of early diagnosis of atypical pneumonia up to 82.3%, shortens the time to establishing the diagnosis and helps optimize therapeutic decisions. This is of particular importance for clinical practice within the healthcare system of Tajikistan.

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MELATONIN-BEMETHYL COMBINATION EFFECT UNDER RESPIRATORY HYPOXIA

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Purpose of the Study. To determine the activity and efficacy, as well as the nature of the interaction between melatonin and bemethyl (2-ethylthiobenzimidazole hydrobromide) in a 1:5 mass ratio, using a model of hypercapnic hypoxia in a sealed volume in mice.

Material and Methods. The study was conducted on 75 C57BL/6 mice weighing 32-38 g using a hypercapnic hypoxia model in a sealed volume. Sixty minutes before the experiment, the animals received a single intraperitoneal injection of 0.1 ml per 10 g of body weight. The doses of melatonin at 10, 20, and 50 mg/kg and bemethyl at 50, 100, and 200 mg/kg were used. The combination was studied at a 1:5 mass ratio (melatonin: bemethyl) using minimum effective and sub-effective antihypoxic doses: 10 mg/kg with 50 mg/kg and 20 mg/kg with 100 mg/kg, respectively. The control group received an equivalent volume of the solvent. The animals then were placed individually into hermetically sealed 270 cm³ glass vessels, submerged in water, and their survival time was recorded. Regression analysis was used to calculate the effective doses (ED₁₆ to ED₈₄).

Results of the study. After 10-15 minutes in the sealed volume, the control group began to show typical signs of hypoxia, ranging from anxiety and loss of coordination to respiratory arrest and death. The average survival time in this group was 19.3 ± 0.9 minutes.

Melatonin exhibited a dose-dependent antihypoxic effect, extending the survival of mice: at a dose of 10 mg/kg to 22.00 ± 1.4 minutes ($p=0,444$, here and below – in relation to placebo, Duncan test), at 20 mg/kg to 27.8 ± 2.3 minutes ($p=0,034$), and at 50 mg/kg to 31.8 ± 2.9 minutes ($p=0,002$). The ED₅₀ calculated for melatonin in this model was 98.97 mg/kg.

Bemethyl also increased the animals' survival time under hypoxia. At a dose of 50 mg/kg, the average survival time was 23.2 ± 2.7 minutes ($p=0,304$), at 100 mg/kg — 28.2 ± 1.7 minutes ($p=0,030$), and at 200 mg/kg — 36.4 ± 4.6 minutes ($p=0,00004$). The ED₅₀ calculated for bemethyl was 210.4 mg/kg.

The combination of melatonin and bemethyl showed the following results: 50 mg/kg of bemethyl with 10 mg/kg of melatonin prolonged survival by 28.8% compared to the control group (24.8 ± 2.1 minutes, $p=0,156$). The combination of 100 mg/kg bemethyl with 20 mg/kg melatonin showed the most pronounced antihypoxic effect among all tested doses (both individual and combined). The average survival time in this group was 46.0 ± 4.3 minutes, which is 138.5% longer than in the control group ($p=0,000018$). When this combination was analyzed, the calculated ED₅₀ for melatonin as a part of composition was 14.7 mg/kg and the same for bemethyl was 84.55 mg/kg.

Conclusions. On the model of hypercapnic hypoxia in a sealed volume, it was demonstrated that individually, both melatonin and bemethyl have a pronounced effect on the organism's resistance to low oxygen conditions, increasing the survival time of mice. The combination of melatonin with bemethyl in a 1:5 mass ratio under similar conditions has a significantly greater effect and demonstrates a synergistic increase in activity and efficacy. The activity of melatonin in the combination is increased by 6.7-fold, and that of bemethyl by 2.5-fold. The efficacy of the combination (100 mg/kg bemethyl with 20 mg/kg melatonin) significantly exceeds the results of the individual components.



**МИНИСТЕРСТВО ЗДРАВООХРАНЕНИЯ И
СОЦИАЛЬНОЙ ЗАЩИТЫ НАСЕЛЕНИЯ
РЕСПУБЛИКИ ТАДЖИКИСТАН**



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Душанбе

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