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**POST-INFECTIOUS COUGH HYPERSENSITIVITY SYNDROME:  
MODERN PROBLEM SOLVING**

**СИНДРОМ ПІСЛЯІНФЕКЦІЙНОЇ КАШЛЕВОЇ  
ГІПЕРЧУТЛИВОСТІ: СУЧАСНЕ РІШЕННЯ ПРОБЛЕМИ**

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In outpatient of the clinic practice cough is a common symptom of diseases of the respiratory system. After acute infectious diseases of the respiratory tract (3-8 weeks after the disease), convalescent patients may have a dry cough. This symptom should be defined as post-infectious cough hypersensitivity syndrome (PCHS) according to the recommendation of the American College of Chest Physicians (ACCP) [1, с. 55]. The study of pathophysiology, the search for new methods of assessment and methods of therapy of various types of this syndrome remain relevant for practicing doctors [3, с. 1133].

**Aim:** to optimize the treatment of patients with post-infectious cough hypersensitivity syndrome by using nebulizer therapy of 0.1% sodium hyaluronate solution and to study the dynamics of indicators of adaptation reactions of the organism (ARO) in this pathology and periods of temporary incapacity of patients.

**Materials and methods:** patients after acute infectious diseases of the respiratory tract, 3-8 weeks after the disease

90 patients aged from 19 to 52 years, who were diagnosed with PCHS, were examined at the municipal institution “City Clinical Hospital № 2” of the city of Vinnytsya. The first group (main) consisted of 45 patients, the second (comparison group) – also 45 patients. The groups were representative by age and gender. The courses of drug treatment were in accordance with the protocols of the Ministry of Health.

All patients of both groups were prescribed antitussives in the recommended daily dosage: dextromethorphan 30 mg three times a day. Patients of the main group additionally received nebulizer therapy with 0.1% hyaluronic acid (HA) solution twice a day, a course of treatment of 12-16 sessions.

The type of general non-specific adaptation reaction of the body was determined by the ratio of the percentage of lymphocytes to segmented neutrophils – the adaptation index. According to the classical method of L. Kh. Garkavi [2, c. 131] typing of ARO was carried out before treatment, on the 5th and 15th day of treatment.

The reliability of the results was determined using the Student test (Stat Soft Statistica v.6.0 package). Results with an error of  $p < 0.05$  were considered reliable.

**The results of the research and their discussion.** Patients had complains as a dry cough that bothered them during the day, occasionally at night, fatigue, sleep disturbances, a feeling of dryness and “tickling” in the throat, hoarseness, musculoskeletal pain, sometimes urinary incontinence, and emotional lability at the beginning of treatment. Pungent smells, physical exertion, a long emotional conversation, changes in air temperature and humidity provoked coughing attacks. This disrupted the patient’s daily activities and prevented him from performing professional duties, reducing the quality of life.

Unfavorable AROs (reactivation – activation index more than 0.91, acute and chronic stress – activation index 0.32 – 0.41 and less than 0.31, respectively [2, c. 131]) in almost every third of the examined, without differences between groups: in patients of the main group ( $n = 45$ ), acute stress was detected in 26.2%, chronic stress in 15.3%, reactivation reactions in 1.8%, while patients in the comparison group ( $n = 45$ ) – acute stress – in 25.0%, chronic stress – in 13.0%, reactivation reactions – in 2.1% ( $p > 0.05$ )

were observed in the peripheral blood of the examined patients. favorable adaptive reactions (reactions of calm activation – activation index – 0.42 – 0.51 and increased activation – index more than 0.72 [2, c. 131]) were also detected with the same frequency and were equal in the group additionally receiving HA, respectively in 16.4% (n = 45) and 15.1% (n = 45) of patients and in the main group – in 16.1% (n = 45) and 16.0% (n = 45) of people (p > 0.05).

In patients of the comparison group, a significant decrease number of acute stress reactions was noted on the 5<sup>th</sup> day of therapy by 15.0% (n = 45) (p < 0.05), on the 15<sup>th</sup> day they were not observed. Chronic stress reactions increased on the 5<sup>th</sup> day of treatment by 12.0% (n = 45) against the initial level, and on the 15<sup>th</sup> day by 7% (n = 45), respectively, but these changes were not significant (p > 0.05). Compared to the initial values, the number of preeactivation reactions on the 5<sup>th</sup> day increased by 8.0% (n = 45) (p > 0.05), and on the 15<sup>th</sup> – by 14.0% (n = 45) (p < 0.05). There was an increase in resting activation responses on the 5<sup>th</sup> and 15<sup>th</sup> day by 5.0% (n = 45) compared to baseline values, but these indicators were not significant (p > 0.05). The number of reactions of increased activation decreased on the 5<sup>th</sup> day by 3.0% (n = 45), and on the 15<sup>th</sup> day of therapy, their increase was noted by 5.0% (n = 45) compared to the indicators obtained before the start of treatment (p > 0.05). In patients who received complex treatment using nebulizer therapy with HA solution, there was a decrease in the number of acute stress reactions on the 5<sup>th</sup> day of treatment by 3.0% (n = 45), on the 15<sup>th</sup> day they were not noted (p > 0, 05). Significant reduction of chronic stress reactions on the 5<sup>th</sup> day of treatment by 8.6% (n = 45), and on the 15<sup>th</sup> day by 12.0% (n = 45) compared to the indicators obtained at the beginning of treatment (p < 0, 05) was revealed. The data are significantly lower than the similar indicators of the control group (p < 0.01). There was no change in preeactivation reactions during treatment in patients of the main group, but their number was significantly lower than in patients of the comparison group (p < 0.01). An increase in the reactions of calm adaptation was noted on the 5<sup>th</sup> day by 1.4% (n = 45), and on the 15<sup>th</sup> – by 1.5% (n = 45) compared to the values obtained before the treatment. The obtained data were not reliable (p > 0.05). The number of reactions of increased activation significantly increased on the 5<sup>th</sup> day of observation by 22.3% (n = 45) compared to the initial indicators (p < 0.01), and on the 15<sup>th</sup> day by 12.0% (n = 45) respectively (p < 0.001). These data were significantly lower than similar indicators of the comparison group (p < 0.001).

Thus, as a result of complex treatment with the inclusion of nebulizer therapy with HA solution in patients with PCHS, there was a more significant increase in the number of reactions of increased activation

( $p < 0.001$ ) (favorable reactions) compared to similar data of the control group. The dynamics of ARO of this type indicates the presence of a complete remission of the disease in patients [2, c. 134]. In 52% ( $n = 45$ ) of people who received traditional therapy, a significant increase in the number of chronic stress reactions and preactivation ( $p < 0.01$ ) (unfavourable responses) was observed compared to the main group. These changes are a marker of incomplete remission [2, c. 134].

It should be noted that antitussive drugs were canceled in 39.4% ( $n = 45$ ) of patients in the main group, and they proceeded to work since the 10<sup>th</sup> day of treatment. However, 45.5% ( $n = 45$ ) of patients in the comparison group still continued taking antitussive drugs on the 10<sup>th</sup> day of treatment and could not perform their professional duties on a full scale (if prolonged linguistic communication was required). Thus, the average duration of temporary disability in the persons that underwent a combination treatment which involved the use of nebulizer therapy with a solution of HA was ( $12.0 \pm 1.7$ ) days, and in the patients who took just antitussive drugs it was ( $18.0 \pm 2.9$ ) days. The expediency of pathogenetic direction of dry cough therapy is emphasized by the significant advantage ( $p < 0.05$ ) of combination treatment plan in the main group.

**Conclusions.** Our results have scientific and practical significance.

First, we expand our understanding of the pathogenetic cause of post-infectious dry cough – reversed functional failure of the mucociliary matrix, which leads to irritation of irritant receptors and is manifested by the syndrome of post-infectious cough hypersensitivity, but can be reduced with the use of hyaluronic acid.

Secondly, A rational combination of medicinal drugs and the nebulizer method of hyaluronic acid administration allows to quickly eliminate the symptoms of the disease, restore the quality of life of patients, and achieve complete remission of post-infectious cough hypersensitivity syndrome.

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