

## COMPREHENSIVE ASSESSMENT OF THE RESPIRATORY SYSTEM IN CHILDREN WITH ACUTE BRONCHIOLITIS AND CORRECTION OF THE DETECTED CHANGES

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**Annotation:** *The article is sanctified to the problem of sharp bronchiolitis for children. Actuality of this problem does not cause doubts: from data of statistics, annually the more than 150 million cases of bronchiolitis register oneself in the whole world, 7-13% that is required stationary treatment, and 1-3% hospitalizations in the separation of intensive therapy. A peak of morbidity is on children in age from 3 to 9 months. Most often viruses come forward an etiologic factor - респираторно-синцициальный (swingeing majority of cases - 90%), a meaningful agent is rinovirus, and also viruses of flu A and B, parainfluenza, adenovirus, coronaviruses, metapneumovirus and bocavirus man. Development of bronchiolitis for the children of the first two years of life can stipulate a number of factors. Especially heavily a bronchiolitis flows at prematurely born, children on the artificial rearing, and also for patients with innate teratosiss and immunodeficits. To the article experience of clinical application of suppositorium of "Genferon Lite" in treatment of patients with this pathology, taking into account.*

**Keywords:** *children, acute bronchiolitis, infectious viral bronchiolitis, respiratory syncytial virus infection, respiratory insufficiency, Genferon Lite*

The relevance of the problem. Maternal and child health is a priority for the entire healthcare system of Sovereign Uzbekistan. In the Republic of Uzbekistan, respiratory diseases occupy first place in the structure of infant mortality and morbidity [12, 13, 21-24]. Acute respiratory viral infections are one of the leading causes of bronchial obstruction in children of the first three years of life [1-3, 6, 8, 25-27]. Acute pneumonia, bronchitis and bronchiolitis occurring with bronchial obstructive syndrome (BOS), which often causes an unfavorable outcome of the underlying disease in a child, are widespread in young children [7, 10]. The occurrence and development of acute bronchiolitis (OB) in up to 90% of cases is influenced by the respiratory syncytial virus (RSV) [5, 9-12]. Acute viral infections with lower respiratory tract infections are transmitted by 11-12% of children of the first year of life, 6% of children aged from one to 2 years and 3.5% of children older than 2 years [2, 8, 13, 14-17]. Among infants under the age of 12 months suffering from acute respiratory viral infections, bronchi and bronchioles are involved in the inflammatory process in 1/3 of cases, of which in 1/3 of cases BF develops [4, 8, 10]. Viral infections of the lower respiratory tract account for 17% of hospitalizations at an early age [9]. Mortality in viral bronchiolitis and bronchitis does not exceed 0.3-1.0%, and children with concomitant diseases, in

particular premature, suffering from bronchopulmonary dysplasia or congenital heart defects, die [6, 14, 18-20]. In OB, there is a widespread inflammation of small bronchi and bronchioles against the background of a viral infection in a young child, which manifests itself in the form of a syndrome of bronchial obstruction with respiratory failure and hypoxemia, with auscultatory phenomena in the lungs such as diffuse crepitus and wheezing [6, 8]. In severe cases of bronchiolitis in a child, the respiratory rate reaches 70 per minute or more, difficulty breathing with retraction of the compliant places of the chest is observed, accompanied by cyanosis, lethargy, and a decrease in the amount of food [4]. The nature of OB in 90% of cases is viral, and most often its etiological factor is the respiratory syncytial (RSV) virus [5, 6], in other cases adenovirus, rhinovirus, parainfluenza virus, metapneumovirus, coronavirus. Despite the successes achieved, the problem of treating patients with OB has not been completely resolved to date and has attracted the attention of scientists and practitioners. Virus-induced dyspnea in young children often provokes the formation of hyperresponsiveness of the respiratory tract, with subsequent relapse of biofeedback. In this regard, the most interesting is a comprehensive assessment of the severity of respiratory disorders in OB and the implementation of effective etiologic and pathogenetic therapy [2, 11]. Despite the wide range of existing treatment methods, the results of therapy do not always satisfy practitioners, which necessitates the development of new additional treatment methods [8, 14]. Given the etiological factor of the disease, the use of the antiviral drug Genferon-Light is considered as such a method. The aim of the study was a functional assessment of respiration in children with acute bronchiolitis and the study of the effectiveness of the antiviral drug Genferon-Light as part of complex therapy.

**Material and research methods.** We examined 53 sick children with acute bronchiolitis from 2 months to 2 years of age, 28 boys and 25 girls who were hospitalized in children's wards and in the intensive care unit of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care over the past 3 years. Group I consisted of 25 children who received traditional therapy; group II included 28 children, who were prescribed suppositories of Genferon-Light rectally at a dose of 125,000 IU x 2 times a day for 5 days as part of complex therapy. Clinical examination of patients included a thorough collection of medical history, complaints, clinical picture of the disease, auscultatory data that provide maximum information in the diagnosis of OB. A general analysis of blood, urine, feces was performed. Instrumental research methods included an X-ray examination of the chest organs. As special studies, we developed a comprehensive assessment of the degree of bronchial obstruction in children with OB. As reliable diagnostic criteria, we chose the respiration rate, blood oxygen saturation by pulse oximetry, and the RDAI (Respiratory Distress Assessment Instrument) rating of respiratory disorders according to Lowell DI et al (1987). The clinical criteria of the RDAI scale, indicating the degree of bronchial

obstruction, included such physical data as wheezing (determination of them during inhalation and exhalation, as well as the number of pulmonary fields involved) and retraction of compliant places of the chest (subclavian, intercostal, hypochondrium), the intensity of which was expressed in points.

Research results and discussion. In the distribution of patients depending on age and gender, it turned out that a slightly larger group consisted of children aged 2 months to 1 year - 60.4%, and the total number of boys exceeded girls (52.9% and 47.1%, respectively). When distributing patients according to the season of the year, we identified mainly children who fell ill in the autumn (34%) and winter (49%) months of the year. Such epidemic rises are associated with the activation of viral infections, especially the activation of RSV. The number of children living in the city exceeded the number of children from the rural population (58.5% and 41.5%, respectively). The study of the history of life showed that in 34.0% of cases (18 children), there was antenatal pathology caused by toxicosis of the 1st and 2nd half of pregnancy and the pathological course of childbirth, as well as a violation of the fetus (entanglement of the umbilical cord around the neck, asphyxiation, violation cerebral circulation, etc.). From the history of the disease, it was also found that in the prodromal period, 96.2% of patients had sneezing and copious discharge from the nose and lasted, which lasted an average of two to three days. In the overwhelming majority, the disease began with a deterioration in general condition, an increase in body temperature, and the appearance of pronounced catarrhal phenomena. In OB patients observed by us, a serious condition was diagnosed in 15 (28.3%) patients, in the remaining 38 (71.7%) patients, the condition was moderate. Upon admission to the clinic, in 11 children the body temperature increased to 38-39°C, in 34 - it was subfebrile, in 8 patients the body temperature was normal.

The overwhelming majority of patients at the height of the disease showed signs of shortness of breath, shortness of breath, cough, cyanosis. Problems associated with respiratory failure in children caused by OB have caused breast failure in 84.9% of children, mainly under the age of 1 year. During auscultation, crepitus was heard during inhalation (96.2%) and wheezing during exhalation (100%). Clinical indicators such as problems with feeding, lethargy and / or lethargy, tachypnea, expansion of the wings of the nose, significant retraction of the compliant places of the chest, cyanosis were observed in the vast majority of patients to varying degrees. Dry and painful cough on admission was observed in 41.5% of patients, wet cough with a small amount of mucous or mucopurulent sputum separation in 58.5%. In the general blood test, 49 patients (92.5%) showed anemia, and 35 patients (66.0%) showed slight leukocytosis with relative lymphocytosis and a moderate acceleration of ESR. In 18 patients (34.0%), the leukoformula and erythrocyte sedimentation rate were within the age norm. A chest X-ray was performed in 48 patients and in almost all cases hyperpneumatization, peribronchial infiltration, and an underlined interstitial

component confirming the diagnosis of OB were noted. Upon admission to the hospital, all patients were prescribed standard treatment, based on No. 155 order of the Ministry of Health of the Republic of Uzbekistan. First of all, the requirements of the medical and protective regime were observed. The treatment of patients under our supervision was carried out taking into account the clinical picture and the severity of the course of OB. Bronchodilators, oxygen therapy, glucocorticosteroids, antibiotic therapy were included in the standard treatment of severe OB with severity of symptoms of bronchial obstruction. A prerequisite for treatment was the additional introduction of fluid. In cases of detection of "background" states, an appropriate correction was carried out. In the complex treatment of children, much attention was paid to proper nutrition and the additional use of fluids. To conduct etiotropic and anti-inflammatory therapy as part of a comprehensive treatment for OB patients, the antiviral drug Genferon-Light was additionally prescribed. To assess the effectiveness of Genferon-Light, all the examined patients were conditionally divided into 2 groups. The control group consisted of 25 children who received traditional therapy. Group II included 28 children who were given Genferon-Light suppositories together with standard therapy. The method of using the antiviral drug Genferon-Light was carried out as follows: as part of complex therapy, OB patients were prescribed suppositories of Genferon-Light per rectum at a dose of 125,000 IU x 2 times a day for 5 days. For a comprehensive assessment of the degree of respiratory disorders in OB, for the first time in the conditions of the pediatric unit of the SFRNCEMP, we used such indicators as respiratory rate (BH), hemoglobin oxygen saturation (SpO<sub>2</sub>) and the respiratory impairment scale - RDAI (according to Lowell DI). The clinical criteria of the RDAI scale, showing the degree of bronchial obstruction, included such symptoms as wheezing (during inhalation and exhalation, as well as the number of pulmonary fields involved) and retraction of the compliant places of the chest (subclavian, intercostal, hypochondrium), the intensity of which was expressed in points (from 0 to 4).

Each parameter (wheezing, chest retraction) detected in the patient was summed up to obtain a general assessment of respiratory disorders. The maximum total number of points for wheezing is 8 and for retracts of compliant places of the chest was 9 points. A comprehensive assessment of the degree of bronchial obstruction was performed upon admission of patients to the hospital and in the dynamics of the disease. In 17 (32.0%) patients with OB, the following indicators of respiratory disorders were revealed upon admission: BH ≤ 50 per minute, SpO<sub>2</sub> 91-94% and an RDAI score of 6 points, which corresponded to a mild degree of bronchial obstruction. In 24 patients, BH at admission was observed in the range of 50-60 times per minute, SpO<sub>2</sub> - 86-90% and the RDAI score was 7-9 points. The average degree of bronchial obstruction was observed in 45.4% of patients with OB. In 12 (22.6%) patients, when receiving a BH, it was more than 60 per minute, SpO<sub>2</sub> ≤ 85% and more than 10 points were revealed with an RDAI score. We correlated these data to a severe degree of

bronchial obstruction. In all children, regardless of the severity of the disease, a deterioration in pulmonary gas exchange was detected due to uneven regional relations of alveolar ventilation and capillary blood flow. Changes in the mechanical and gas exchange properties of the lungs are characterized by obstructive restructuring of the total capacity of the lungs, pronounced airway obstruction. The results obtained in the course of our study dictate the need for a differentiated approach to the treatment of respiratory disorders in patients with OB, depending on the degree of bronchial obstruction. There is a definite correlation between low oxygen saturation and a more serious course of the disease and a longer hospitalization period. In this regard, in severe OB with a more pronounced degree of bronchial obstruction, it is advisable to include bronchodilators, oxygen therapy, glucocorticosteroids, antiviral drugs, antibiotic therapy and additional inhalations in the treatment complex. It should be emphasized that studies of the degree of respiratory disorders carried out in the dynamics of the disease made it possible to monitor therapeutic measures successfully and in a timely manner and carry out appropriate corrections.

Assessment of respiratory disorders according to the RDAI scale before discharge from the hospital was less than 4 points, saturation during breathing with room air was  $SpO_2 \geq 95\%$ , and respiratory rate less than 40 times per minute, which we considered signs of no symptoms of bronchial obstruction in children with OB. You can also consider these parameters as additional objective criteria for recovery. Thus, a comprehensive assessment of the degree of bronchial obstruction in children with OB by BH, blood oxygen saturation, and the scale of respiratory disorders - RDAI contributes to a differentiated approach in the treatment of biofeedback, which will reduce the duration of the disease, the duration of hospitalization and alleviate the symptoms of respiratory disorders in young children. In childhood, the proportion of acute respiratory diseases among the entire infectious pathology is up to 90%. The etiological agents of most acute respiratory infections are rhinoviruses, coronaviruses, adenoviruses, respiratory syncytial virus, enteroviruses, as well as influenza and parainfluenza viruses. The contribution of individual viruses to the development of the disease is variable and depends on the age of the patients and the time of year, however, rhinoviruses are known to be the most common pathogens in all age groups. Often (5%) two or more viruses are detected in a patient with a respiratory infection.

Assessment of the effectiveness of the drug Genferon-Light was carried out according to the following criteria: the duration of the main clinical symptoms of the disease, physical changes in the lungs, pulse oximetry data, and the average duration of the disease. The results of the study showed that in patients with children to whom Genferon-Light was prescribed, there was a significant positive dynamics of clinical indicators in relation to those in patients of group I. The terms for normalizing the body temperature of children with OB were  $3.4 \pm 0.1$  days in group I and  $2.8 \pm 0.2$  days in group II. A more pronounced tendency to normalize symptoms of general

intoxication (lethargy, decreased appetite, improved well-being), we also noted in the II group of patients. A more pronounced positive dynamics of physical changes in the lungs, such as the disappearance of shortness of breath, wheezing and signs of bronchial obstruction, was noted in the group of children who received additional Genferon-Light. One of the important indicators was the relief of shortness of breath and perioral cyanosis. So these indicators were stopped in a shorter time in patients of group II ( $3.8 \pm 1.1$  and  $4.4 \pm 0.9$  days, respectively ( $P < 0.05$  and  $P < 0.05$  in relation to group I), whereas in group I, these periods were significantly longer,  $4.3 \pm 1.2$  and  $4.8 \pm 1.2$  days, respectively, we recorded the disappearance of wheezing on exhalation on  $4.8 \pm 1.4$  days in patients of group I and on  $4.4 \pm 1.3$  days in patients of group II ( $P < 0.01$ ). In young children, the chest has its own characteristics, which is expressed in the significant participation of pliable places of the chest during shortness of breath. So, a significant retraction of the intercostal spaces was stopped in patients of the 1st group on  $4.5 \pm 1.2$  days, while in children of the 2nd group these periods were only  $4.0 \pm 1.1$  days ( $P < 0.001$  in relation to the 1st group). Analyzing such signs of OB as bloating of the wings of the nose and coughing, it is worth noting that in children of group II the cough relief of bloating of the wings of the nose compared to patients of the first group occurred in significantly lower terms ( $P < 0.01$  and  $P < 0.01$  respectively). The study showed that the oxygen saturation data in the studied groups normalized on average on the 3rd day of the disease in both groups, and the trend towards faster improvement in pulse oximetry was noted in group II ( $3.8 \pm 1.4$  days and  $3.1 \pm 1.2$  days, respectively,  $< 0.001$ ). The average duration of this pathology, depending on various types of therapy, was  $4.9 \pm 1.3$  days in group I and  $4.6 \pm 1.5$  days in group II.

**Conclusions.** The clinical manifestations of OB vary in severity of the disease. Symptoms characteristic of all children are persistent auscultatory changes in the lungs associated with the degree of obstruction. A comprehensive assessment of respiratory disorders (RR, wheezing in the lungs, RDAI scale, oxygen saturation) in young children allows us to diagnose the degree of bronchial obstruction. Based on the changes in the scale for assessing respiratory disorders, 3 variants of the course of OB in children were identified: severe, characterized by significant violations of bronchial obstruction; moderate, in which moderate disorders are detected; and light, with conditionally normal scale values. As a result of our studies, we have identified the high clinical efficacy of the antiviral drug Genferon-Light in the complex treatment of OB in young children. In addition to interferon- $\alpha$ , the amino acid taurine, which is part of Genferon-Light, as a powerful adaptogen, has pronounced antioxidant, membrane-stabilizing and anti-inflammatory properties. The high clinical efficacy of Genferon-Light and the unique combination of its components make it possible to recommend the use of this drug in pediatric practice of MPIs of various levels for the complex treatment of OB in young children.

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