



EVALUATION OF THE EFFECTIVENESS OF THE DRUG "GENFERON-LITE" IN ACUTE BRONCHIOLITIS IN CHILDREN

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Annotation

This article is devoted to the problem of acute bronchiolitis (OB) in children. The urgency of this problem is beyond doubt: according to the most conservative estimates, more than 150 million cases of bronchiolitis are registered worldwide every year, 7-13% of which require inpatient treatment, and 1-3% require hospitalization in the intensive care unit. The peak incidence occurs in children aged 3 to 9 months. The most common etiological factor is viruses - respiratory syncytial (the vast majority of cases - 90%), a significant agent is rhinovirus, as well as influenza A and B viruses, parainfluenza, adenovirus, coronavirus, metapneumovirus and human bokavirus. The development of bronchiolitis in children of the first two years of life can cause a number of factors. Bronchiolitis is especially severe in premature infants, children on artificial feeding, as well as in patients with congenital malformations and immunodeficiency. The article presents the experience of clinical use of Genferon Light suppositories in the treatment of patients with this pathology, taking into account its antiviral, antibacterial and immunomodulatory effects.

Keywords: childhood, bronchiolitis, respiratory syncytial viral infection, treatment, Genferon Light

Introduction

Maternal and child health protection is a priority for the entire healthcare system of Sovereign Uzbekistan. In the Republic of Uzbekistan, respiratory diseases occupy the first place in the structure of infant mortality and morbidity [4, 12, 13, 16]. Acute respiratory viral infections are one of the leading causes of bronchial obstruction in children of the first three years of life [1, 2, 8]. Acute pneumonia, bronchitis and bronchiolitis, occurring with bronchoobstructive syndrome (BOS), which often causes an unfavorable outcome of the underlying disease in a child, are widespread in young





children [3, 9]. Respiratory syncytial virus (RSV) affects the occurrence and development of acute bronchiolitis (AB) in up to 90% of cases [3, 7, 18].

Acute viral infections affecting the lower respiratory tract are carried by 11-12% of children in the first year of life, 6% of children aged one to 2 years and 3.5% of children older than 2 years [2, 9, 16]. 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 BOS develops [6]. Viral infections of the lower respiratory tract account for 17% of hospitalizations at an early age [5]. Mortality in viral bronchiolitis and bronchitis does not exceed 0.3-1.0%, and children with concomitant diseases, in particular premature infants suffering from bronchopulmonary dysplasia or congenital heart defects, die [15, 17, 19].

In this case, there is widespread inflammation of the small bronchi and bronchioles against the background of a viral infection in an early child, which manifests itself in the form of bronchial obstruction syndrome with respiratory insufficiency and hypoxemia, with such auscultative phenomena in the lungs as diffuse crepitation and wheezing [1, 2]. With severe bronchiolitis in a child, the respiratory rate reaches 70 in a minute or more, there is difficulty breathing with retractions of the compliant places of the chest, accompanied by cyanosis, lethargy, a decrease in the volume of nutrition [6]. The nature of AB is viral in 90% of cases, and most often its etiological factor is respiratory syncytial virus (RSV) [7, 16], in other cases adenovirus, rhinovirus, parainfluenza virus, metapneumovirus, coronavirus. Despite the successes achieved, the problem of treating patients with AB has not been completely solved to date and attracts the attention of scientists and practitioners.

Virus-induced dyspnea in young children often provokes the formation of hyperreactivity of the respiratory tract, with subsequent recurrence of BOS. In this regard, the most interesting is a comprehensive assessment of the severity of respiratory disorders in AB and the conduct of effective etiotropic and pathogenetic therapy [2, 10]. Despite the wide range of existing treatment methods, the results of the therapy do not always satisfy practitioners, which dictates the need to develop new additional methods of treatment [9, 15, 17, 20]. Taking into account the etiological factor of the disease, the use of the antiviral drug Genferon-Lite is considered as such a method.

The aim of the study was to evaluate the effectiveness of the antiviral drug Genferon-Lite as part of complex therapy.





Material and Methods of Research

53 patients with acute bronchiolitis aged from 2 months to 2 years, 28 boys and 25 girls who were hospitalized in intensive pediatrics and pediatric intensive care units of the Samarkand branch of the Republican Scientific Center for Emergency Medical Care over the past 3 years were examined. Group I consisted of 25 children who received traditional therapy; group II included 28 children who were prescribed Genferon-Light suppositories 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 anamnesis of the disease, complaints, clinical picture of the disease, auscultative data that provide maximum information in the diagnosis of the disease. A general analysis of blood, urine, and feces was carried out. Instrumental research methods included X-ray examination of the chest organs. As special studies, we have developed a comprehensive assessment of the degree of bronchial obstruction in children with AB. As reliable diagnostic criteria, we selected respiratory rate, oxygen saturation of blood according to the results of pulse oximetry and assessment of respiratory disorders according to the RDAI scale (Respiratory Distress Assessment Instrument) by Lowell DI and co-authors (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 lung fields involved) and retractions of compliant places of the chest (subclavian, intercostal, subcostal), the intensity of which was expressed in points.

The results of the study and their discussion. When distributing 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 found that mostly children 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 rural residents (58.5% and 41.5%, respectively).

The study of the life history showed that in 34.0% of cases (18 children), there was an antenatal pathology caused by toxicosis of the I and II half of pregnancy and the pathological course of childbirth, as well as violation of the fetal condition (entanglement of the umbilical cord around the neck, asphyxia, violation of cerebral circulation, etc.). From the anamnesis of the disease, it was also found out that in the prodromal period, 96.2% of patients had sneezing and copious nasal discharge and lasted, which lasted on average from two to three days. In the overwhelming majority,





the disease began with a deterioration of the general condition, an increase in body temperature and the appearance of pronounced catarrhal phenomena.

In the patients we observed, 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 rose 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 had signs of difficulty breathing, shortness of breath, cough, cyanosis.

Problems associated with respiratory disorders in children caused by AB caused breast rejection in 84.9% of children, mainly under the age of 1 year. During auscultation, crepitation was heard when inhaling (96.2%) and wheezing when exhaling (100%). Clinical indicators such as feeding problems, lethargy and/or lethargy, tachypnea, dilation of the wings of the nose, significant retractions of the compliant places of the chest, cyanosis were observed in a significant majority of patients to varying degrees. Dry and painful cough at admission was observed in 41.5% of patients, wet cough with the separation of a small amount of mucosal or mucopurulent sputum in 58.5%.

In the general blood test, anemia was noted in 49 patients (92.5%), in 35 patients (66.0%), minor leukocytosis with relative lymphocytosis and moderate acceleration of ESR were detected. In 18 patients (34.0%), the leukoformula and erythrocyte sedimentation rate were within the age norm. Chest X-ray examination was performed in 48 patients and in almost all cases hyperpneumatization, peribronchial infiltration, stressed interstitial component were noted, confirming the diagnosis of AB.

All patients were prescribed standard treatment upon admission to the hospital. 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 severity of the course of the disease. Broncholytic drugs, oxygen therapy, glucocorticosteroids, and antibiotic therapy were included in the standard treatment of severe AB with the severity of symptoms of bronchial obstruction. An additional fluid injection was a prerequisite for treatment. In cases of detection of "background" conditions, a corresponding correction was carried out. In the complex treatment of children, great attention was paid to proper nutrition and additional fluid intake.

To carry out etiotropic and anti-inflammatory therapy as part of the complex treatment of these patients, the antiviral drug "Genferon-Light" was additionally prescribed. To assess the effectiveness of Genferon-Lite, we conditionally divided all





the examined patients into 2 groups. The control group consisted of 25 children who received traditional therapy. Group II included 28 children who were prescribed Genferon-Lite suppositories along with standard therapy. The method of application of the antiviral drug Genferon-Light was carried out as follows: as part of complex therapy, patients were prescribed Genferon-Light suppositories 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 AB, we used indicators such as respiratory rate (RR), hemoglobin oxygen saturation (SpO²) and the scale of respiratory disorders - RDAI (according to Lowell DI). The clinical criteria of the RDAI scale, which shows the degree of bronchial obstruction, included symptoms such as wheezing (during inhalation and exhalation, as well as the number of lung fields involved) and retraction of the compliant places of the chest (subclavian, intercostal, subcostal), 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 an overall assessment of respiratory disorders (Table 1). As can be seen from the table, the maximum total number of points for whistling wheezes was 8 and for retractions of compliant places of the chest was 9 points.

Table 1. Scale of respiratory disorders (RDAI)

| The symptom | Points | | | | | |
|---|--------|------------|-------------------------|---------------|-----------|-----|
| | 0 | 1 | 2 | 3 | 4 | Max |
| Whistling wheezes: | | | | | | |
| - during inhalation | No | In the end | The first 1/2 | The first 3/4 | The whole | 4 |
| - during exhalation | No | Partly | The whole | - | breath | 2 |
| - the number of lung fields involved | No | 1 or 2 | exhalation is 3 or 4 | - | - | 2 |
| Retractions of the compliant places of the chest: | | | | | | |
| - subclavian | No | Lungs | Medium | Expressed | - | 3 |
| - intercostal | No | Lungs | Medium | Expressed | - | 3 |
| - subcostal | No | Lungs | Medium | Expressed | - | 3 |
| Total | | | | | | 17 |

A comprehensive assessment of the degree of bronchial obstruction was carried out upon admission of patients to the hospital and in the dynamics of the disease. The following indicators of respiratory disorders were detected in 17 (32.0%) AB patients upon admission: RR<50 per minute, SpO² 91-94% and an RDAI score of <6 points, which corresponded to a mild degree of bronchial obstruction. In 24 patients, RR at admission was observed within 50-60 times per minute, SpO² – 86-90% and the RDAI score was 7-9 points. The average degree of bronchial obstruction was noted in 45.4% of AB patients. In 12 (22.6%) patients at admission,



RR was more than 60 per minute, $SpO_2 \leq 85\%$ and more than 10 points were detected 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, deterioration of pulmonary gas exchange was revealed, caused by 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 lung capacity, pronounced violations of the patency of the respiratory tract.

The results obtained in the course of our study dictate the need for a differentiated approach to the treatment of respiratory disorders in AB patients, depending on the degree of bronchial obstruction. There is a definite relationship between low blood oxygen saturation and a more serious course of the disease and a longer period of hospitalization. In this regard, with a severe course of AB with a more pronounced degree of bronchial obstruction, it is advisable to include bronchodilators, oxygenotherapy, glucocorticosteroids, antiviral agents, antibiotic therapy and additional inhalations in the treatment complex.

It should be emphasized that the studies conducted in the dynamics of the disease to study the degree of respiratory disorders made it possible to successfully and timely monitor therapeutic measures and carry out appropriate correction. The assessment of respiratory disorders on the RDAI scale, before discharge from the hospital, was less than 4 points, saturation when breathing room air was $SpO_2 \geq 95\%$, and the respiratory rate was less than 40 times per minute, which we considered signs of the absence of symptoms of bronchial obstruction in children with AB. These parameters can also be considered as additional objective criteria for recovery.

Thus, a comprehensive assessment of the degree of bronchial obstruction in children with acute respiratory failure, oxygen saturation of the blood and on the scale of respiratory disorders - RDAI contributes to a differentiated approach in the treatment of BOS, 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 all infectious diseases 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 patients and the time of year, however, it is known that rhinoviruses are the most common pathogens in all age groups. Often (5%), two or more viruses are detected in a patient with a respiratory infection.





The effectiveness of the drug Genferon-Lite was evaluated 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 sick children who were prescribed Genferon-Lite, there was a significant positive dynamics of clinical indicators in relation to those in patients of group I (Table 2.).

Table 2. Dynamics of the main clinical signs of the disease in children with AB in the compared groups.

| | Clinical signs | Groups of children | | The reliability of the difference, P |
|----|--|--------------------|----------|--------------------------------------|
| | | I-group | II-group | |
| 1 | Decrease in body temperature | 3,4±0,1 | 2,8±0,2 | <0,05 |
| 2 | Improved appetite | 3,5±0,1 | 3,1±0,2 | <0,05 |
| 3 | Reduction of bronchial obstruction symptoms | 4,5±1,1 | 4,1±0,9 | <0,001 |
| 4 | The disappearance of shortness of breath | 4,3±1,2 | 3,8±1,1 | <0,05 |
| 5 | The disappearance of oral cyanosis | 4,8±1,2 | 4,4±0,9 | <0,05 |
| 6 | Disappearance of intercostal spaces retraction | 4,5±1,2 | 4,0±1,1 | <0,001 |
| 7 | The disappearance of wheezing in the lungs | 4,8±1,4 | 4,4±1,3 | <0,01 |
| 8 | Cough | 4,4±1,2 | 4,3±1,1 | <0,01 |
| 9 | Inflating the wings of the nose | 4,1±1,1 | 3,7±0,9 | <0,01 |
| 10 | Normalization of SpO ² indicators | 3,8±1,4 | 3,1±1,2 | <0,001 |
| 11 | Average terms of hospitalization | 4,9±1,1 | 4,6±0,9 | <0,01 |

The period of normalization of body temperature in children with AB was 3.4±0.1 days in group I and 2.8±0.2 days in group II. A more pronounced tendency to normalize the 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-Lite. One of the important indicators was the relief of dyspnea and perioral cyanosis.

Thus, these indicators were stopped in a shorter time in patients of group II (by 3.8±1.1 and 4.4±0.9 days, respectively (P<0.05 and P<0.05 relative to group I),



whereas in group I these terms were significantly longer, 4.3 ± 1.2 and 4.8 ± 1.2 days, respectively.

The disappearance of wheezing on exhalation was recorded by us at 4.8 ± 1.4 days in patients of group I and 4.4 ± 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 the pliable places of the chest, during shortness of breath. Thus, a significant retraction of intercostal spaces was stopped in patients of group 1 for 4.5 ± 1.2 days, whereas in children of group 2, these terms were only 4.0 ± 1.1 days ($P < 0.001$ relative to group 1). Analyzing such signs of AB as inflating of the wings of the nose and cough, it is worth noting that in children of group II, cough relief, inflating of the wings of the nose in comparison with patients of group I occurred at a significantly low time ($P < 0.01$ and $P < 0.01$, respectively).

The study showed that oxygen saturation data in the studied groups on average normalized on the 3rd day of the disease in both groups, and the tendency to a faster improvement in pulse oximetry was noted in group II (3.8 ± 1.4 days and 3.1 ± 1.2 days, respectively, $P < 0.001$). The average duration of this pathology, depending on different types of therapy, was 4.9 ± 1.3 days in group I and 4.6 ± 1.5 days in group II.

Conclusions

Clinical manifestations AB differ in severity of the disease. Symptoms characteristic of all children are persistent auscultative 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 makes it possible to diagnose the degree of bronchial obstruction. Based on the changes in the assessment scale of respiratory disorders, 3 variants of the course of AB in children were identified: severe, characterized by significant violations of bronchial patency; moderate, in which moderate violations are detected; and mild, with conditionally normal scale values.

As a result of our research, we have revealed the high clinical efficacy of the antiviral drug Genferon-Lite in the complex treatment of AB in young children. In addition to interferon- α , the amino acid taurine, which is part of Genferon-Lite, being a powerful adaptogen, has pronounced antioxidant, membrane-stabilizing and anti-inflammatory properties. The high clinical efficacy of Genferon-Lite and the unique combination of its components allow us to recommend the use of this drug in pediatric practice of medical institutions of various levels for the complex treatment of AB in young children.





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