Acute Bronchiolitis in Children

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ABSTRACT

Statya posvyashchena probleme ostrogo bronchiolita u detey. Actuality of this problem does not cause doubt: according to modest estimates, more than 150 million people are registered in the world. sluchaev bronchiolitis, 7-13% of which require inpatient treatment, and 1-13% - hospitalization and separation of intensive therapy [2,12]. The most common etiological factors are viral-respiratory-synthsitial (in most cases - 90%), the main agent is rhinovirus, as well as viral influenza A and V, parainfluenza, adenovirus, coronovirus, metapneumovirus. The development of bronchiolitis in children is the first two years of life, and a number of factors are associated with it. Especially, bronchiolitis occurs in premature infants, children with bronchopulmonary dysplasia and artificial feeding, as well as development and immunodeficiency in patients with congenital diseases. Provoditsya passive immunization of children with high risk of bronchiolitis in RSV season with injectable monoclonal antibodies to RSV- Palivizumab.

Purpose of the work: In this review article, the clinical manifestations and mechanisms of origin, comparative diagnosis, optimal treatment and outcome of bronchiolitis are considered.

Keywords: Bronchiolitis, premature children, clinic, treatment, outcome, palivizumab

Enter. Acute bronchiolitis (AB) often develops in children under 2-3 years of age, is one of the most severe infections of the upper and lower respiratory tract (mainly viral), often causes severe conditions in the acute period, and there is a risk of developing bronchial asthma later. BLT is an acute infectious, mainly viral, inflammatory disease of the lower and upper respiratory tract, which is characterized by swelling and necrosis of epithelia, the formation of strong mucus and the development of small bronchial obstruction. This disease mainly occurs in young children[1,10].

The cause of this disease is 64-75% rhinosyncytial virus, and it occurs mainly in children under 2 years of age. 95% of sick patients develop antibodies against respiratory syncytial virus, but they do not protect children from a new infection. Kindergarten and kindergarten children are more affected.

The virus is contagious, its incubation period lasts 2-5 days. The virus can be released through the nasal secretions, in addition to the respiratory tract, the virus can also pass mechanically, through direct contact with the mucous membranes of the eyes or nasopharynx, or through surrounding objects. It can live for several hours on hands and surrounding objects. Therefore, nosocomial infections can be reduced by washing hands, changing clothes, and wearing gloves.

Depending on the structure of G-protein, two subtypes are distinguished: A (severe bronchiolitis) and B subtype. One subtype of the

virus dominates each season. RSV has the characteristic of chronic persistence in macrophages, inhibits apoptosis, blocks the macroorganism's corticosteroid receptor, causes chronic inflammation and stimulates the proliferation of the bronchial muscle layer, which creates conditions for the development of bronchial asthma[3,8].

Bronchiolitis is caused by the following viruses:

■ flu virus (8-20%);
■ parainfluenza (10-30%);
■ rhinovirus (10-16%);
■ adenoviruses (4-10%);
■ metapneumoviruses (5-50%). Э: А = 1,8:1.

This infection passes with a high temperature, with a lot of whistling, but the demand for oxygen is less compared to other viruses (because it occurs in older children and atelectasis develops less);

■ bocavirus (5%);
■ mycoplasma (5-15%), often occurs in older children and adults. Bronchiolitis virus is related to herpes simplex virus, epidemic parotitis, enterovirus. In most cases, bronchiolitis is classified as undetermined etiology, especially in primary health care organizations. Based on the results of investigations, bronchiolitis (BLT) occurs in 75% of cases in children under 1 year of age, and 95% in children under 2 years of age[4,9]. The maximum development of bronchiolitis is detected in children aged 2-8 months. Boys are affected more often than girls (1.25:1).

Hospitalization of children under one year of age with bronchiolitis increased from 12.9% to 31.3% per 1,000.

Among older children and adults, they are often infected with disorders of congenital and acquired cellular immunity, after transplantation of organs and hematopoietic stem cells.

Infants who were breastfed early and who received colostrum with a high concentration of immunoglobulin A are less likely to have bronchiolitis (BLT)[5,7]. In children, airway obstruction is associated with edema, mucus accumulation, and cellular debris, but not with bronchoconstriction. In young children, the main problem is the narrowness of the bronchial path and the underdevelopment of collateral ventilation.

If the bronchiolitis goes well, after 3-4 days the epithelium of the bronchi will be restored, but the villi will not regenerate before 2 weeks. Mucus in the bronchial passages is swallowed by macrophages

Table 1.

Rate of detection of infection depending on age in children with bronchoobstructive syndrome

Infection	**Rate of infection by age**			
	0-2 years old	2-5 years old	5-9 years old	9-15 years old
RSV	++++	+++	++	++
Adenovirus	++	++	+	0
Parainfluenza virus	++	++	++	++
Rhinovirus	+	++/++	++/+++	++
Metapneumovirus	++	**+**	**+**	0
Mycoplasma pneum.	**+**	**++**	**+++**	**++++**

Factors influencing the development of bronchiolitis.

■ premature birth, birth with low mass.;
■ if the child is less than 3 months old;
■ if the bronchus has undergone lung dysplasia;
■ cardiac anomaly with pulmonary hypertension or lung anomaly;
■ severe congenital and acquired immunodeficiency.
■ low social and economic conditions;
■ overcrowded groups in kindergarten;
■ parental smoking.

CLINIC

Acute bronchiolitis occurs mainly in young children, the incubation period is 2-5 days. Children are restless, their appetite decreases. Hyperthermia up to 38 °C, coughing, wheezing, symptoms of respiratory failure, rhinitis are added. In older children and adults, RSV-infection occurs only in the upper respiratory tract, and in young children, the infection reaches the lower respiratory tract after 2-5 days. Hyperthermia 39 ° rose.

Children under one year may have hypothermia, lethargy. A cough appears, wheezing, wheezing, tachycardia, does not eat, the child may vomit after coughing. conjunctivitis and pharyngitis are observed. Liver and spleen are detected during palpation (due to hyperinflation of the lungs and flattening of the diaphragm). In severe cases, in the chest, the intercostal space of the ribs can be stretched, the wings of the nose expand, cyanosis, otitis (80-85%), sometimes myocarditis, extrasystole, pneumonia, apnea can be detected [3,6]. In premature children, 5-36% of apnea was detected, in 0.5-12% of cases it was registered in sleep due to its noobstructive nature, mostly in children under 2 years of age. In the first days of the disease, 10% of children are transferred from apnea to mechanical ventilation. Impaired ventilation leads to impaired perfusion and hypoxia develops. During breathing, the narrowing of the bronchi increases, and energy consumption increases. The best indicator of the severity of the disease is hypoxia, critical hypoxia, in which respirations are more than 50 times per minute. Indicators that adversely affect the outcome of the disease:

■ if the child is up to 6 months old;
■ if there are additional lung and heart diseases;
■ lethargy;
■ if apnea, acidosis relapses;
■ panting > 70;
■ nasal cells are enlarged;
■ the chest is deeply drawn;
■ if paradoxical breathing is observed;
■ if the oxygen saturation at room temperature is below 92% before administration of r-agonists;
■ cyanosis, if the amount of oxygen in the given mixture is higher than 40%;
■ C-reactive protein > 0.8 mg.

Comparative diagnosis is carried out with the following diseases: bronchial asthma, congestive heart failure, bronchitis, aspiration, bacterial, viral, mycoplasma pneumonia. In rare cases, some diseases can stimulate bronchiolitis: these include - cystic fibrosis, reflux, when a foreign body falls.

Additional checks

General and biochemical analysis of blood is carried out. An X-ray examination reveals an increased anterior-posterior ratio of the chest, hyperinflation of the lungs, focal infiltrations, peribronchial joints, flattening of the diaphragm. Villous epithelia regenerate slowly, so atelectasis can be preserved after bronchiolitis.

The oxygen saturation index (< 93%) is important for the outcome of the disease. Antigen detection (respiratory syncytial virus antigen) from a nasal swab takes 30 min. Sensitivity - 87-91%, specificity - 96-100%.

Treatment.

Oxygen therapy (oxygen saturation not lower than 94%) and hydration (the child has a temperature and strong panting, the child does not drink, as a result, loses a lot of fluid) are required.

Inhalation with hypertonic saline solution together with oxygen therapy has a positive effect, relieves the secretion of mucus. If there is a suspicion of bacterial infection (hyperthermia, toxicosis, additional otitis, infiltrative foci on X-ray, leukocytosis, positive bacteria on smear), antibacterial drugs are given.

It is difficult to differentiate bacterial infection in children under 6 months, therefore, it is considered correct to give antibiotics, especially if toxicosis is observed. Ampicillin is a broad-spectrum antibiotic. Cefotaxime is a cephalosporin of the 3rd generation, safe and effective, active against gram-positive and gram-negative bacteria, but less effective against staphylococcus, pseudomonas, and listeria.

Antiviral therapy.

Ribavirin is an RSV-specific virostatic. Reduces the duration of detection of the virus in inhalation.

Absolute instructions for inhalation:

■ history of pulmonary bronchus dysplasia;

■ congenital heart defect;

■ identified humoral or combined immunodeficiency. In addition to RSV, ribavirin inhibits the replication of influenza, parainfluenza, adenovirus, and measles viruses.

Adrenergic drugs - albuterol, salbutamol, epinephrine are administered through a nebulizer or turbohaler, as in asthma. When inhaling with adrenergics, oxygen saturation may decrease strongly. The reason is that during exhalation, the small bronchi collapse, therefore, increased oxygenation is required.

Anti-inflammatory drugs.

Based on some data, the use of inhaled or systemic corticosteroids changes the clinical signs and reduces the length of hospital stay in young children.

Prevention

Specific immunoglobulin with anti-RVS activity - palivizumab. This drug is a monoclonal antibody against B-protein of RSV. Monthly administration of palivizumab during acute bronchiolitis reduces hospitalization of premature infants with RSV-infection and prevents the development of severe forms of bronchiolitis. This drug is the main indication for premature children and children under 2 years of age with chronic lung disease with pulmonary hypertension or heart disease with hemodynamic changes.

Palivizumab is given at 15 mg/body weight, 3-5 times per month as an injection.

The consequence

■ Despite the number of recommended drugs, the most effective method is oxygen therapy. The patient's condition quickly improves and ends with recovery.

Children with bronchiolitis have high reactivity in the bronchi for 5 years. These children are prone to bronchial asthma.

Mortality is 0.2%-1%, 5-7% if the patient has additional heart and lung diseases. In 80% of cases, death from bronchiolitis occurs in children in the first 6 months, boys are 1.5 times more likely than girls.

Summary. Thus, acute bronchiolitis in young children is one of the actual problems.

The inflammatory process is observed in the lower respiratory tract and damages small bronchi and bronchioles. This disease occurs in early childhood children.

One of the etiological factors is respiratory syncytial virus (90%), bronchiolitis develops in 20%. 95% of patients develop antibodies against respiratory syncytial virus. but they do not protect children from new infections. Factors affecting the development of bronchiolitis in children under 2 years of age - for premature children and children under 2 years of age with chronic lung disease with pulmonary hypertension or heart disease with hemodynamic changes, passive immunization of such children with monoclonal antibodies - Palivizumab 15 mg/body weight, every 3-5 months should be injected. hospitalization of premature children with RSV infection is reduced and prevents the development and complications of severe forms of bronchiolitis.

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