Bronchitis In Children: Principles Of Modern Therapy

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ABSTRACT

Bronchitis in children is diverse and is one of the most common diseases of the respiratory tract. The course of the disease can be either acute or chronic. Acute bronchitis (J20.0–J20.9), according to the modern classification, is acute inflammation of the bronchial mucosa without signs of damage to the lung tissue. Acute (simple) bronchitis (J20), as a rule, occurs against the background of an acute respiratory viral infection, which in 20% of patients is an independent cause of the disease. At the same time, 40–45% of patients have viral-bacterial associations. Among the viral pathogens, the most common are influenza, parainfluenza, adenoviruses, respiratory syncytial, corona and rhinovirus, ECHO and Coxsackie viruses. Among bacterial pathogens, Streptococcus pneumoniae, Haemophilus influenzae and Moraxella catarrhalis are currently the leaders.

Keywords: children, method, treatment, bronchitis, therapy.

Introduction

Clinically, acute bronchitis is manifested by cough, diffuse dry and variable moist rales in the lungs. X-ray examination does not have specific signs for this disease; usually, an increase in the pulmonary pattern, expansion and unstructuredness of the roots of the lung are determined in the absence of infiltrative and focal shadows in the lung tissue.

Materials And Methods

In young children, bronchitis can occur with bronchial obstruction syndrome - acute obstructive bronchitis (J20.0), characterized by diffuse damage to bronchi of different sizes against the background of an acute respiratory viral infection, which causes characteristic clinical symptoms. Broncho-obstructive syndrome usually develops on the 3rd–4th day of acute respiratory viral infection and is manifested by expiratory shortness of breath, noisy wheezing, scattered dry and varied moist rales in the lungs. X-ray reveals an increase in the pulmonary pattern, signs of swelling of the lung tissue (increased transparency, horizontal position of the ribs, high standing and flattening of the domes of the diaphragm) in the absence of infiltrative and focal shadows in the lungs. Relapses of obstructive bronchitis are always associated with ARVI and usually stop by the age of 3–4 years.

Results And Discussion

The complexity of the problem of chronic bronchitis is, to a certain extent, reflected in the International Statistical Classification of Diseases and Related Health Problems (International Statistical Classification) [2], where there are different names (variants) of chronic bronchitis, which are clinically difficult to distinguish, which means poses certain difficulties in everyday practice:

• simple chronic bronchitis (J41.0), mucopurulent (J41.1), mixed simple and mucopurulent (J41.8);
• chronic bronchitis, unspecified (J42);
• chronic obstructive and asthmatic bronchitis (J44).

The most severe form of chronic bronchitis is bronchiolitis obliterans (J43). Our observations showed that bronchiolitis obliterans can in an extremely short time lead to the formation of emphysema in a child with progressive pulmonary heart failure [1]. Bronchiolitis obliterans is a polyetiological chronic disease of the small airways, resulting from acute bronchiolitis. The morphological basis of the disease is concentric narrowing or complete obliteration of the lumen of bronchioles and arterioles in the absence of changes in the alveolar ducts and alveoli, leading to the development of emphysema and disruption of pulmonary blood flow. The clinical picture is manifested by shortness of breath, unproductive cough, physical changes in the form of crepitus and fine wheezing, persistent irreversible obstruction of the airways.

The choice of starting drug is carried out empirically, taking into account the probable etiology and sensitivity of the suspected pathogen to antimicrobial drugs (Table 1). In this case, monotherapy with an oral drug is always preferable. Currently, three groups of antibiotics, the so-called "gold standard" drugs, are most widely used as first-choice antibacterial drugs in outpatient practice in the treatment of bronchitis: penicillins (amoxicillin, inhibitor-protected penicillins), cephalosporins of the II–III generation) and macrolides.

Table 1. Antibacterial therapy for bronchitis in children

Main pathogens	Antibiotics of choice	Alternative antibiotics
Streptococcus pneumoniae Haemophilus influenzae Moraxella catarrhalis	Amoxicillin or macrolides orally	
Streptococcus pneumoniae Haemophilus influenzae* Moraxella catarrhalis	Amoxicillin/clavulanate	II generation cephalosporins orally, III generation parenterally

Note. * the presence of risk factors in patients that increase the likelihood of infection by strains producing β-lactamases (for example, recent use of antibiotics)

In the last decade, there has been an increase in the proportion of infections caused by pathogens producing β-lactamases, enzymes that can destroy the β-lactam ring in the structure of penicillins and cephalosporins [2].

This defense mechanism is typical for pathogens such as Moraxella catarrhalis, Haemophilus influenzae, and enterobacteria. Currently, compounds that inactivate bacterial β-lactamases are used in clinical practice: clavulanic acid (clavulanate), sulbactam and tazobactam. These compounds are called β-lactamase inhibitors. The creation of combined "protected" drugs made it possible not only to preserve the "old" penicillins, but also to expand the spectrum of their action against a number of gram-negative bacteria [3].

The most commonly used combination is amoxicillin and clavulanate. Adding an inhibitor β-lactamases (clavulanic acid) to amoxicillin significantly increases the effectiveness of antibacterial therapy in cases where the pathogens are strains that produce β-lactamases [4]. Interest in amoxicillin/clavulanate is increasing due to the emergence of new dosage forms aimed at improving its tolerability. These, in particular, include Flemoklav Solutab (amoxicillin/clavulanate in a 4:1 ratio; dispersible tablets containing 125/250/500 mg of amoxicillin trihydrate and 31.25/62.5/125 mg of potassium clavulanate). The drug is produced by Astellas Pharma CJSC. The antibiotic is microspheres containing

amoxicillin and clavulanic acid. The microsphere contains an acid-resistant filler that is not susceptible to the destructive action of hydrochloric acid of gastric juice, therefore, preliminary dissolution of the antibiotic in water before oral administration does not affect its pharmacokinetics.

For adults and children weighing more than 40 kg, the drug is prescribed 500/125 mg 3 times a day. For children aged 2 to 12 years (body weight approximately 13–37 kg), the daily dose is 20–30 mg/kg amoxicillin and 5–7.5 mg/kg clavulanic acid. This usually amounts to: for children 2–7 years old (body weight about 13–25 kg) – 125/31.25 mg 3 times a day; for children 7–12 years old (body weight 25–37 kg) – 250/62.5 mg 3 times a day. For severe infections, these doses can be doubled (maximum daily dose – 60 mg/kg amoxicillin and 15 mg/kg clavulanic acid).

Features of the pharmacokinetics and pharmacodynamics of macrolides ensure eradication of the main respiratory pathogens, and safety and good tolerability ensure high adherence to treatment, which allows us to consider this group of antibiotics as first-line drugs in the treatment of bronchitis in children, especially in patients with intolerance to β-lactams [4].

For mild to moderately severe exacerbation of chronic inflammation, more often in school-age children, treatment can be carried out with oral antibiotics.

Conclusion

In case of pronounced inflammation activity, antibiotic therapy is carried out in a “stepped” therapy mode. In this case, antibiotics are first prescribed parenterally (intravenously, intramuscularly). When the patient’s condition improves (usually after 3–5 days), they switch to oral antibiotic administration [5].

Important elements of complex therapy for patients with bronchitis are physiotherapeutic measures, massage, postural drainage, and physical therapy.

References

1. Rozinova N.N., Sokolova L.V., Geppe N.A., Sereda E.V. Pharmacotherapy for bronchitis in children. Guide to pharmacotherapy in pediatrics and pediatric surgery / Edited by A.N. Tsaregorodtseva, V.A. Tabolina. Pulmonology. M.: 2012; 145–154.
2. Acute respiratory diseases in children: treatment and prevention. M.: 2012.
3. Borisov S.P. Chronic pneumonia in children. In the book. “Pneumonia in children” / Edited by S.Yu. Kaganova, Yu.E. Veltishcheva. M.: 2015; 103–114.
4. Working classification of the main clinical forms of bronchopulmonary diseases in children (mod. Geppe N.A., Rozinova N.N., Mizernitsky Yu.L., etc.) // Medical newspaper. 2019; 9:11:2:7–9.
5. Zakharov P.P. Clinical and functional features and outcomes of various forms of chronic lung diseases in children. Diss. Ph.D. honey. na- uc. M.: 2012; 138.