



CLINIC, DIAGNOSTICS AND INDICATIONS FOR HOSPITALIZATION FOR PNEUMONIA IN CHILDREN

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Pneumonia is an acute infectious disease, different in etiology, characterized by focal lesions of the lungs, which is more often manifested by intoxication, respiratory disorders, local physical changes in the lungs and the presence of an infiltrative shadow on a chest x-ray. The incidence of pneumonia is 15-20 per 1000 children in the first year of life. In outpatient settings, early diagnosis and rational therapy of pneumonia in children are serious problems. Pneumonia in children is still one of the urgent problems of pediatrics. [3,5,16,19,21]. Currently, there is an increase in the incidence of pneumonia in children and high mortality.

In children aged 6 months - 6 years, the most common causative agent of pneumonia is pneumococcus. *H. influenzae* type b causes up to 10% of complicated forms. *Staphylococcus* is rarely detected. *H. influenzae* are found in lung punctures quite often, usually in combination with pneumococcus [4], but their role is not completely clear. Atypical pneumonia caused by *M. pneumoniae* is observed in no more than 10-15% of patients, *Chl. pneumoniae* is even rarer [6,15,20].

Intrauterine pneumonia is more often caused by *Streptococcus pneumoniae*, which is the cause of invasive and non-invasive forms of pneumonia, and gram-negative bacteria - *Escherichia coli*, *Klebsiella pneumoniae*, less often - *Staphylococcus aureus*, *Listeria monocytogenes*. Associations with cytomegalovirus, herpes simplex virus, and fungi of the genus *Candida* are possible [8]. At the age of 7-15 years, the main bacterial causative agent of typical pneumonia is pneumococcus (35-40%), rarely - pyogenic streptococcus, the proportion of atypical pneumonias exceeds 50% - they are caused by *M. pneumoniae* (20-60%) and *Chl. pneumoniae* (6-24%)

[9,12,18]. The main causative agent of atypical pneumonia is *Chlamydia trachomatis*. The first manifestation of chlamydial infection is conjunctivitis in the first month of a child's life, and the symptoms of pneumonia appear after 6-8 weeks of life.

According to the nature of the clinical and radiological picture, focal, focal-confluent, segmental, croupous and interstitial pneumonia are distinguished. According to the severity of the course, pneumonia is distinguished as mild, moderate, severe, extremely severe. The severity of the clinical course is determined by the presence and severity of pulmonary heart failure and toxicosis, as well as the presence of complications. In turn, complications are divided into pulmonary - pleurisy, pulmonary destruction.

In the etiology of nosocomial pneumonia, both the hospital microflora, usually resistant to antibiotics, and the patient's auto-microflora play a role. Among pathogens, *E.coli*, *K. pneumoniae*, *Proteus spp.*, *Enterobacter spp.*, *Pseudomonas aeruginosa*, and less often *S.aureus* are more common. Often, infection occurs when performing therapeutic and diagnostic manipulations (sputum suction, catheterization, bronchoscopy, thoracentesis). The nature of the microflora depends on the profile of the hospital and the anti-epidemic regime.

Focal pneumonia (bronchopneumonia) are more common in young children and account for 30-40% of the total number of pneumonias [10,14].

Focal pneumonia develops acutely against the background of an acute respiratory infection already in the first days or 4-7 days from its onset. A viral infection disrupts the protective mechanism of the lung, suppresses



phagocytosis, changes the bacterial flora, affects the work of the ciliated epithelium and contributes to the occurrence of inflammatory foci. The severity of pneumonia that developed against the background of an acute viral infection is determined by the nature of the viral infection, the bacterial flora, and the characteristics of the individual reactivity of the child.

Focal pneumonia is characterized by a deep wet cough, moderate intoxication, body temperature rises to 38 ° C, lethargy or anxiety, pallor of the skin, moderate cyanosis of the nasolabial triangle, increased respiration with retraction of the intercostal spaces and tension of the wings of the nose. An important diagnostic sign of focal pneumonia is a characteristic clinical picture in the lungs: persistent local fine bubbling rales or crepitus, mainly on one side.

For the diagnosis of pneumonia, a chest x-ray is of great help, which allows you to determine the extent of the lesion and the presence of complications. In pneumonia, radiographs reveal infiltrative shadows, not always homogeneous, in the form of foci of various sizes. The process is often unilateral, with damage to the lower parts of the right lung. In the general analysis of blood with focal pneumonia, moderate hypochromic anemia can be detected, almost half of the sick children have leukocytosis. Some patients have leukopenia with a shift of the formula to the left. At the same time, often (in 1/3 of patients), the number of leukocytes remains within the normal range, ESR increases, but not in all children. In the first days from the onset of the disease, CBS is usually characterized by the presence of acidosis, more often respiratory, less often metabolic.

Segmental pneumonia develops acutely, sometimes violently. The temperature in patients often rises to 39-40°C. There is a pronounced toxicosis, sometimes with signs of exicosis. Attention is drawn to the features of the skin (pallor with a waxy or grayish tinge, marble pattern), dry, painful, less often wet cough, grunting or groaning breathing. A diagnostic sign of segmental pneumonia is a characteristic percussion picture: a shortening of the sound over the lungs, turning into dullness, respectively, the projection of the segments of the lung affected by the inflammatory process. Weakened breathing is heard over the affected areas of the lung, sometimes with a bronchial or amphoric tinge.

Moist rales can be heard in small quantities, very briefly or not at all. An x-ray examination reveals intense, sometimes uneven darkening in the region of one, two or more segments of the lung or the entire lobe.

Interstitial pneumonias occur in less than 1% of all pneumonias [11,13].

In young children, their acute onset is noted: the disease is severe, with symptoms of respiratory failure (severe shortness of breath with a respiratory rate of up to 80-100 per minute, cyanosis of the nasolabial triangle, pallor of the skin, generalized cyanosis, tension of the wings of the nose, retraction of the intercostal spaces, fever, later with the addition of frequent obsessive, excruciating whooping cough. A classic example of interstitial pneumonia is pneumocystis pneumonia.

Croupous pneumonia is caused by pneumococci: the inflammatory process is characterized by a cyclic course with high fever and crisis-type resolution. Radiologically, it is difficult to distinguish the shadow of lobar pneumonia from segmental pneumonia, so this diagnosis is based on clinical data. In recent years, lobar pneumonia has been diagnosed rarely (1-3% of the total number of pneumonias), mainly in cases of outpatient treatment without antibacterial drugs due to late diagnosis. The rarity of lobar pneumonia in the first year of life is explained by the lack of sensitization in children of this age to pneumococci.

Staphylococcal pneumonia is characterized by an acute onset, high body temperature, rapidly increasing tachypnea, dyspnea, cyanosis, lethargy or agitation, flatulence, anorexia, vomiting, regurgitation, diarrhea. Extrapulmonary complications often occur (otitis media, pyelonephritis, etc.). Massive infiltrative shadows within one or more segments of a lobe or several lobes. The presence of air cavities (bull), abscesses, pleurisy, pneumothorax.

Streptococcal pneumonia proceeds rapidly, characterized by severe intoxication, chills. Pronounced interstitial changes with multiple rounded foci in different stages of resorption.

Mycoplasma pneumoniae pneumonia is accompanied by catarrhal phenomena of the upper respiratory tract. The disease has a protracted, undulating course. The onset is gradual, an obsessive pertussis-like non-productive



cough is characteristic, physical data in the lungs are scarce.

Pneumocystis pneumonia is often observed in children with impaired cellular immunity (mainly children who were in the neonatal unit, in intensive care units, children from closed groups who are re-admitted to the department of respiratory infections).

Indications for hospitalization of children with pneumonia are: the severity of the condition: cyanosis, shortness of breath, increased respiration, groaning, oxygen saturation (SaO₂) less than 92%, lowering blood pressure (BP), pulmonary-pleural complications, severe dehydration, refusal to eat; the presence of severe concomitant diseases, immunocompromised conditions; the age of the child is up to 6 months; lack of response in patients with pulmonary infiltrate to starting ABT within 48 hours; unsatisfactory social and living conditions. Risk factors for death in children with CAP are late access to a doctor and hospitalization, low socioeconomic status of the family, early age of the child, and severe comorbidities. Treatment of pneumonia in children is carried out taking into account the etiological factor, clinical form and characteristics of the course of the disease. The basic principles of the treatment of pneumonia are reduced to taking measures aimed at combating oxygen deficiency, infectious onset and toxicosis, restoring the impaired functions of various systems and organs, preventing possible complications, increasing resistance and improving the reactivity of the body.

With pneumonia, bed rest is recommended only for the febrile period of the disease. In the acute period, children practically do not eat; restoration of appetite is the first sign of improvement in severe processes with prolonged fever. The rapid reverse dynamics of clinical symptoms allows you to transfer the child to the general mode. Be sure to ventilate the premises. Patients with intoxication and severe pneumonia may require intravenous infusion of urine-controlled fluids, serum electrolytes, and hematocrit.

Mucolytics and expectorants are indicated when the patient develops an intense, unproductive cough. The choice of an antibacterial drug is carried out empirically, taking into account different pathogens and the severity of the process. Indications for the replacement of the drug

is the absence of a clinical effect within 36-48 hours for non-severe and 72 hours for severe pneumonia. In complicated pneumonia, treatment begins with parenteral drugs, replacing them with oral ones when the effect occurs (stepwise method). For mild pneumonia, both in the hospital and on an outpatient basis, preference is given to oral drugs: amoxicillin, amoxicillin clavulanate (augmentin), cefuroxime-axetil (zinnat), acting both on pneumococci and on Haemophilus influenzae.

In atypical pneumonia, macrolides and azithromycin are the drugs of choice. Since they also act on the coccal flora, these drugs can be used in people with allergies, but their widespread use is undesirable due to the stimulation of drug resistance of the flora. Evaluation of the effectiveness of treatment is carried out after 24, 36 and 48 hours of treatment. The full effect is recorded when the temperature drops below 38.0 ° C (without antipyretics) and the general condition improves, appetite appears, while the x-ray picture may improve or remain the same. This indicates the sensitivity of the pathogen to the drug, therefore, treatment with this drug should be continued [12,13,14,17]. A partial effect is recorded with an improvement in the general condition and appetite, as well as the absence of negative dynamics in the focus, but while maintaining a febrile temperature, such a picture is observed of a suppurative focus (destruction) or an immunopathological process (metapneumonic pleurisy). At the same time, the antibiotic is not changed, the full effect occurs later - when the abscess is emptied or anti-inflammatory drugs are prescribed. If the patient remains febrile, increases infiltration in the lungs or general disorders, it is considered that there is no effect in these cases, an immediate change of antibiotic is required. The duration of treatment for non-severe pneumonia is 5-7 days, for complicated forms 10-14 days (2-3 days after the temperature drops). With nosocomial pneumonia, the replacement of the drug is carried out according to bacteriological data or empirically already after 24-36 hours, at the first signs of inefficiency. Fluoroquinolones are used in children over 12 years of age and in extremely severe cases in younger patients with resistance to enterobacillary, Pseudomonas aeruginosa and atypical flora. In anaerobic processes, metronidazole is used; in fungal etiology processes, fluconazole, ketoconazole.



Treatment of non-severe pneumonia under good conditions is possible at home. With the rapid onset of the effect of antibiotics, other types of therapy are not needed. Antipyretics for pneumonia are not prescribed, as this may make it difficult to assess the effectiveness of treatment. Ventilation is a must. Before the onset of the effect, bed rest, with rapid reverse dynamics, the child is transferred to half-bed rest, and from the 6-10th day to the general regime. Hardening can be resumed after 10-14 days, but heavy physical exertion (sports) is acceptable after 6 weeks, with mild and 12 weeks after complicated pneumonia.

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