

PNEUMONIA OF NEWBORNS

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Abstract

Depending on the time and conditions of infection, neonatal pneumonia is divided into intrauterine and postnatal, which can be community-acquired, hospital-acquired, ventilator-associated, or aspiration. Congenital pneumonia, difficult to distinguish from neonatal respiratory distress syndrome, is a component of generalized infection of the fetus and newborn. Based on the time of clinical manifestations, neonatal pneumonia is divided into early (1st week of life) and late (8–28th day of life). The etiology of pneumonia in newborns depends on the time, route and conditions of infection. Diagnosis of the disease in newborns is determined by the level and equipment of the clinic and is based on the detection of antenatal and postnatal risk factors, respiratory and general symptoms, radiological signs, markers of systemic inflammatory response syndrome/bacterial infection and the results of etiological diagnosis.

Keywords

pneumonia, newborns, congenital pneumonia, ventilator-associated event, ventilator-associated pneumonia.

INTRODUCTION

Pneumonia is an acute polyetiological infectious disease characterized by inflammation of the lung tissue distal to the terminal bronchioles with intra-alveolar exudation, which is manifested by intoxication to varying degrees, respiratory failure, symptoms of damage to the lower respiratory tract - DP (shortness of breath, cough, local physical changes) in the presence of infiltrative changes on a chest x-ray.

MATERIALS AND METHODS

Congenital pneumonia is a disease that arose in the prenatal period of a child's development as a result of an ascending infection through the chorioamniotic membranes by the hematogenous (transplacental) route or during intrapartum infection, usually manifests itself in the first 72 hours after birth. Congenital

pneumonia is a consequence of infection of the fetus during pregnancy and usually represents one of the components of a severe systemic infectious disease. Community-acquired pneumonia develops outside the hospital, as well as within 48 hours from hospitalization or 48 hours after discharge.

Nosocomial pneumonia develops after 48 hours of hospital stay or within 48 hours after discharge. Aspiration pneumonia is diagnosed in newborns when infiltrative changes in the lungs are detected during an X-ray examination in cases of aspiration of meconium, blood or milk confirmed by laryngoscopy.

RESULTS AND DISCUSSION

In the neonatal period, the immaturity and process of postpartum adaptation of the respiratory, cardiovascular and immune systems in full-term and especially premature infants, various routes of infection determine differences in epidemiology, risk factors, clinical course and, as a consequence, diagnostic possibilities and outcomes pneumonia compared to other child age groups. Congenital or early pneumonia can occur due to the entry of microorganisms into the lungs from infected amniotic fluid or transplacentally. Newborns are more sensitive to a wide range of pathogens that rarely cause lung damage at other ages, for example, *Listeria monocytogenes*, *Candida* fungi, and cytomegalovirus. Unlike pneumonia in older children, neonatal pneumonia is often accompanied by severe pathological changes in other organs, primarily the cardiovascular system, which aggravates the severity and prognosis of the disease [2-4]. A significant incidence of neonatal pneumonia is associated with the high susceptibility of newborns to infection, infection of the mother during pregnancy and childbirth, as well as difficulties in preventing nosocomial infections in the intensive care unit of newborns and premature infants [3].

Respiratory symptoms include apnea (in 8-10% of preterm and 30-40% of full-term infants), tachypnea (more than 60 breaths per minute at rest), detected in 60-89% of infants, retractions of the compliant areas of the chest - 36 - 91% of patients, cough, which is noted with a frequency of 30-84%, cyanosis occurs in 12-40% of patients [1]. Chlamydial pneumonia is characterized by a paroxysmal whooping cough-like (without reprisal) cough of the staccato type (from the musical term "staccato", translated from Italian - abruptly). In severe respiratory failure, one may notice swelling of the wings of the nose, as well as rhythmic movements of the head in time with breathing (V.F. Znamensky's symptom), which is associated with fatigue of the respiratory muscles and the inclusion of the sternocleidomastoid muscle in the act of breathing. Pulmonary edema with increased permeability of the pulmonary vessels leads to the appearance of protein in the edematous fluid of

the DP of newborns, which is clinically manifested by foamy discharge from the nose and mouth (symptom of E.M. Kravets). In some children, respiratory failure develops in the first minutes or hours of life, which requires early initiation of intensive respiratory therapy [2]. Bronchial secretion can be mucous, mucopurulent or purulent in nature; an increase in the amount of secretion or its change to purulent is an important diagnostic sign of the development of pneumonia in newborns, which is easy to notice in intubated children [3]. Auscultatory symptoms are varied and include decreased or harsh breathing, localized or diffuse moist rales, or crepitus. The detection rate of wheezing ranges from 15 to 85%. Signs of bronchial obstruction may be heard - prolongation of expiration and dry wheezing. The reasons for this are airway obstruction by bacterial and inflammatory products, bronchospasm under the influence of inflammatory mediators [4]. The appearance of bronchial obstruction in oxygen-dependent premature infants, usually starting from the 3rd week of life, is suspicious for the formation of bronchopulmonary dysplasia (BPD) [5]. During percussion, a shortening of the percussion sound is determined over the projection of infiltration in the lungs. At the same time, dullness of percussion sound was found in 40% of full-term newborns with pneumonia [1]. Percussion is not recommended for children in serious condition and premature newborns, since this procedure can significantly worsen the child's condition, leading to intracranial hemorrhages.

The diagnosis of neonatal pneumonia is clinical and radiological. Changes on plain radiographs in these patients vary and include reticulogranular and/or focal infiltrates, bilateral linear shadowing or diffuse decrease in pulmonary pneumatization; Compensatory increased airiness may be detected in areas free from pneumonic infiltration. The X-ray picture of neonatal pneumonia is practically indistinguishable from the X-ray changes that are observed in other respiratory diseases of newborns, primarily in RDS. However, certain radiological signs can help in diagnosing various variants of neonatal pneumonia, as well as in making a differential diagnosis.

Taking into account the course of postnatal cardiorespiratory adaptation, which is also reflected on chest X-rays, congenital pneumonia should be excluded if new infiltrative shadows appear or if X-ray changes persist within 48 hours after birth [2]. Homogeneous shading of the lung tissue or ground-glass changes are usually detected in pneumonia due to hematogenous infection. In this case, against the background of compaction of the lung tissue, the lumens of the bronchi may be visible (symptom "air bronchogram"), which is typical for RDS in premature newborns [3]. Possible x-ray signs in favor of congenital pneumonia in premature

infants compared with RDS may be the appearance of large and small focal shadows against the background of a rough mesh pattern of the pulmonary pattern, thickening of the pulmonary pattern in the hilar zones, a moderate increase in the airiness of the bronchogram, the value cardiothoracic index less than 0.5 at the age of 72 hours of life. With RDS, the lungs appear reduced in size, while with pneumonia, an increase in the airiness of the zones of lung tissue involved in gas exchange can be detected.

CONCLUSION

Thus, pneumonia in newborns is a heterogeneous disease that undergoes pathomorphosis due to changes in the patient population. Diagnosis of pneumonia in newborns depends on the level and equipment of the clinic and is based on the determination of antenatal and postnatal risk factors, respiratory and general symptoms, radiological signs, markers of systemic inflammatory response syndrome/bacterial infection and the results of etiological diagnosis.

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