КЛИНИЧЕСКИЕ ОСОБЕННОСТИ НЕОНАТАЛЬНОЙ ПНЕВМОНИИ

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Аннотация: В данной статье рассматриваются клинические особенности неонатальной пневмонии. Автор сообщает о различных типах неонатальной пневмонии, таких как врожденная, ранняя и поздняя пневмония. Приведены важные сведения и факты о симптомах и причинах, диагностике и лечении неонатальной пневмонии.

Ключевые слова: *легочная, врожденная и ранняя пневмония, бронхолегочная дисплазия (БЛД), рентгенография органов грудной клетки, анализы крови.*

NEONATAL PNEVMONIYANING KLINIK XUSUSIYATLARI

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Annotatsiya: Ushbu maqolada neonatal pnevmoniyaning klinik xususiyatlari muhokama qilinadi.Muallif neonatal pnevmoniyaning tug'ma, erta boshlangan va kech boshlangan pnevmoniya kabi turli xil turlari haqida xabar beradi. Neonatal pnevmoniyaning belgilari va sabablari, diagnostikasi va davolash usullari haqida muhim ma’lumotlar va dalillarni topishingiz mumkin.

Kalit so‘zlar: *o‘pkaga oid, tug‘ma va erta boshlangan pnevmoniya, bronxopulmoner displazi (BPD), ko‘krak qafasi rentgenogrammasi, qon tekshiruvi .*

CLINICAL FEATURES OF NEONATAL PNEUMONIA

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Annotation: This article discusses the clinical features of neonatal pneumonia. The author reports different types of neonatal pneumonia such as congenital, early-onset, and late-onset pneumonia. Also, you can find significant facts and information about symptoms and causes, diagnoses, and treatments of neonatal pneumonia.

Keywords: *Pulmonary, congenital, early-onset pneumonia, bronchopulmonary dysplasia (BPD), Chest x-ray, Blood tests.*

Introduction: Neonatal pneumonia is a serious respiratory infectious disease caused by a variety of microorganisms, mainly bacteria, with the potential for high mortality and morbidity [2,4]. Worldwide neonatal pneumonia is estimated to account for up to 10% of childhood mortality, with the highest case fatality rates reported in developing countries [5,3]. Its impact may be increased in the case of early onset, prematurity, or an underlying pulmonary condition like RDS, meconium aspiration, or CLD/bronchopulmonary dysplasia (BPD) when the pulmonary capacity is already limited. Urea plasma pneumonia and ventilator-associated pneumonia (VAP) have also been associated with the development of BPD and poor pulmonary outcomes [11,16,7]. Pneumonia is the most common serious bacterial infection in newborns after sepsis [4] and depending on the time of manifestation of infection neonatal pneumonia may be classified as early onset pneumonia (within the first 3 or 7 days of life, mostly within 48 hours), or late-onset pneumonia (within 4 and 28 days of life). Congenital or intrauterine pneumonia can be considered a variant of early-onset pneumonia [10]. Other classifications refer to the underlying pathogen, like bacterial or viral pneumonia, or the pattern of lung infiltrates (e.g. g. interstitial pneumonia) on chest radiographs Clinical signs are unspecific and present as respiratory distress

of various degrees, suspicious appearing tracheal aspirates, cough, apnea, high or low temperature, poor feeding, abdominal distension, and lethargy [6]. There are various definitions of early onset pneumonia; some authors have used 48 hours as a cut-off, and others have suggested 7 days. Because of the way, some aetiologic studies have been reported, and the differences in etiology, it may be operationally useful to separate the disease classification between the first week of life and the subsequent three weeks. In most series, Gram-negative bacteria predominate in the first week and Gram-positive bacteria predominate subsequently [13]. The major pathogens responsible for congenital and early-onset pneumonia are listed in Table 1.

Table 1. Causes of congenital and early-onset pneumonia.

Congenital pneumonia	Early-onset pneumonia (may also present at birth)
Toxoplasma gondii	Streptococcus agalactiae
Herpes simplex virus	Escherichia coli
Cytomegalovirus	Listeria monocytogenes
Treponema pallidum	Staphylococcus aureus
Congenital pneumonia	Enterococcus spp.
Toxoplasma gondii	Haemophilus spp.

Late-onset pneumonia results from colonization of the oropharyngeal mucosa by a potential pathogen, which then seeds the lower respiratory tract where inadequate immune defense permits dissemination. Late-onset pneumonia developing in the hospital may be termed healthcare-associated pneumonia (previously nosocomial pneumonia), which has a distinct epidemiology from late-onset pneumonia occurring after discharge. Multiply drug-resistant bacteria are a more frequent cause of healthcare-associated pneumonia, whereas community-acquired viral infections such as respiratory syncytial virus (RSV), para-influenza, and adenovirus are more frequent causes of late-onset pneumonia in the home setting [15]. Table 2 lists frequently occurring late-onset pneumonia pathogens. The source of initial oropharyngeal colonization which leads to pneumonia can be exogenous or endogenous. The common exogenous source includes caretaker skin (usually the hands of a medical professional), contaminated equipment, or environmental surfaces. There is strong evidence that inadequate hand hygiene is a major contributor to healthcare-associated neonatal pneumonia. Two large observational studies comparing nosocomial infection rates before and after the introduction of intensive handwashing improvement initiatives showed significant decreases in neonatal VAP rates [8,17]. The main endogenous sources of micro-organisms that are responsible for late-onset pneumonia are the nasal and oropharyngeal mucosae. Pooled oral secretions in the posterior oropharynx can foster local overgrowth of pathogenic species, whose subsequent aspiration sets the stage for pneumonia.

Table 2. Causes of congenital and early-onset pneumonia.

Bacterial	Viral
Pseudomonas aeruginosa	Respiratory syncytial virus
Enterobacter spp.	Human rhinovirus
Klebsiella species	Human metapneumovirus
Staphylococcus aureus	Adenovirus
Escherichia coli	Parainfluenza virus
Enterococcus spp.	Influenza A or B
Acinetobacter spp.	Coronavirus
Proteus species	Viral
Citrobacter spp.	Respiratory syncytial virus

Symptoms of neonatal pneumonia: Symptoms of bacterial pneumonia vary depending on when the child is infected. Newborns who have early-onset pneumonia have symptoms similar to symptoms of sepsis in newborns, including appearing listless and not feeding well. Newborns who have late-onset pneumonia develop unexplained breathing problems and may need extra oxygen or more breathing support. The amount of sputum (thick or discolored mucus) is increased and changed (for example, becomes thicker and brown). Infants may be very ill and have an unstable temperature [5].

Methods and results: In the clinical routine pneumonia is diagnosed based on a combination of perinatal risk factors, signs of neonatal respiratory distress, positive laboratory studies, radiological signs, and a typical clinical course. Some clinical scenarios are more or less suspicious situations. For example, VAP, reported to be responsible for up to one-third of all nosocomial infections, may be suspected two or more days after the initiation of mechanical ventilation when new or persistent infiltrates are noticed in 2 or more chest radiographs [11]. Additional definition criteria developed by the Centers for Disease Control and [1] include an increase in oxygen and ventilator requirements and at least three of the following signs and symptoms: temperature instability, wheezing, tachypnea, cough, abnormal heart rate, change in respiratory secretions, and abnormal peripheral white blood count.

The most common organisms in VAP in extremely preterm infants are Staphylococcus aureus and especially gram-negative organisms like Pseudomonas aeruginosa, Enterobacter spp, and Klebsiella [19]. Pneumonia caused by ureaplasma species, Eubacteria mainly colonizing the mucosal surface of the respiratory and urogenital tract, may be diagnosed by direct isolation of the organism from endotracheal aspirates using culture or PCR-techniques, by typical chest-x-ray patterns showing disseminated, patchy infiltrates bilaterally with progression to cystic dysplasia, and elevated inflammatory serum-parameters like CRP or an increased white cell count [20,9,12]. An organism that is frequently associated with early-onset pneumonia is Group B Streptococcus. The clinical manifestation occurs usually within 6 to 8 hours of life and can mimic surfactant deficiency syndrome [14].

To diagnose pneumonia, doctors do a chest x-ray. They do blood tests to look for bacteria in the blood. Because infants who have pneumonia may have low levels of oxygen in their blood, doctors measure levels of oxygen in the blood by placing a sensor on a finger or an earlobe. This test is called pulse oximetry. Doctors may also obtain a sample of sputum and test it to look for bacteria. Because pneumonia caused by bacteria may spread, doctors may test newborns for sepsis, which includes a spinal tap. Dr. Gravari: The diagnosis of neonatal pneumonia is based on a combination of clinical, radiographic, and microbiologic findings. According to a clinical standpoint, neonates with sudden onset of respiratory distress or other signs of illness, such as apnea, lethargy, poor feeding, tachycardia, or abdominal distention, should be evaluated for pneumonia, including a complete sepsis workup. However, the challenge is that these findings are not unique to pneumonia. From a radiographic standpoint, you can expect to observe bilateral alveolar densities with air bronchograms, irregular patchy infiltrates, pleural effusions, or occasionally a normal pattern. Pneumonia which is caused by certain bacteria can be difficult to distinguish from respiratory distress syndrome (RDS) in preterm infants. The challenge is that this is a 1st view image, and not very specific.

From a microbiologic standpoint, blood cultures are the gold standard test to identify an organism. For infants who are intubated, Gram stain and culture of tracheal aspirates may help to identify the causative pathogen. If viral (RSV, adenovirus) or other (urea plasma) causes are suspected, specific studies should be obtained, including polymerase chain reaction and viral cultures. The challenges are those cultures of 1 mL blood may not be sensitive, or the trach culture might identify colonization vs. a true infection.

Treatment: Regardless of age at disease onset, treatment of suspected bacterial pneumonia should begin immediately with an empiric antibiotic regimen that is broad enough to cover the most likely etiologic organisms, including those that may be drug-resistant. As more information becomes available, initial coverage should be narrowed, as much as possible, to limit the drawbacks of prolonged exposure to broad-spectrum antibiotics. The diagnosis of pneumonia was made in neonates admitted to the normal Newborn Nursery (NBN) who later had signs of respiratory distress and whose chest radiographs were consistent with pneumonia. Infants were excluded if any of the following symptoms were present: moderate or thick meconium-stained amniotic fluid, prior antibiotic therapy > 24 hours, or need for supplemental oxygen > 8 hours. Infants who were asymptomatic after 48 hours of antibiotic therapy were prospectively randomized to a 4-day group (n = 35) or a 7-day group (n = 38). Infants in the 4-day group were observed in the hospital for 24 hours following cessation of antibiotics and were seen in observation within several days of discharge. The groups were comparable about demographic factors, duration of rupture of membranes, and incidence of maternal chorioamnionitis. Median postnatal ages at the time of identification of respiratory distress symptomatology were 19 hours (range 0.5 to 55 hours) in the 4-day group and 12 hours (range 1 to 72 hours) in the 7-day group. The mean lowering in the length of hospitalization was 2.1 days, with estimated savings of greater than US$700 per shortened hospitalization. Two infants in the 4-day group developed tachypnea during the 24-hour observation period. However, no infants are re-hospitalized for sepsis or pneumonia following discharge. With 95% confidence, the true rate of success for the 4-day group was at least 92% [18].

Conclusion: Although there have been advances in neonatal medicine pneumonia, it remains a serious

problem even in developed countries, mainly due to the increased survival of very preterm births and their susceptibility to early and late bacterial infections. The clinical spectrums of pneumonia are complex, symptoms are often non-specific and laboratory findings may be of limited value, making a rapid and correct diagnosis difficult. The global burden of neonatal pneumonia is huge. Treatments may also be challenging if no organism can be cultivated or in the case of multidrug-resistant bacterial pneumonia. There is no clear evidence from randomized controlled trials favoring a specific antibiotic treatment strategy so treatment decisions are based on local antimicrobial resistance patterns and clinical experience. Efficient intervention must be targeted at all health services and community levels.

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