AJPMHS GLOBAL RESEARCH NETWORK

AMERICAN Journal of Pediatric Medicine and Health Sciences
Volume 2, Issue 1, 2024 ISSN (E): 2993-2149

BACTERIAL, VIRAL AND MUCOPLASMA PNEUMONIA IN CHILDREN

Abdullayev Sardorbek Solijon o‘g‘li

Fergana Institute of Public Health Medicine Assistant Department of Pediatrics.

Abstract: Lung inflammation can be caused by exposure to airborne toxins or irritants, respiratory infections, and lung diseases like asthma or chronic bronchitis. Symptoms may include wheezing, shortness of breath, chest pain, and coughing. Lung inflammation can be acute (rapidly occurring and severe) or chronic (persistent or recurrent). Pneumonia is a lung infection that can make you feel sick. It happens when germs get into your lungs. Symptoms include coughing, fever and difficulty breathing.

Keywords: pneumonia, bacterial pneumonia, viral pneumonia, mycoplasma pneumonia, Lobar pneumonia, bronchopneumonia, World Health Organization and UNICEF, productive cough, pain in the chest, vomiting or diarrhea, decrease in appetite, fatigue, fever.

Pneumonia is an inflammation of the lungs caused by bacteria, viruses, or chemical irritants. It is a serious infection or inflammation in which the air sacs fill with pus and other liquid.

Lobar pneumonia. This affects one or more sections (lobes) of the lungs.

Bronchial pneumonia (or bronchopneumonia). This affects patches throughout both lungs.

The main types of pneumonia are:

Bacterial pneumonia. This is caused by various bacteria. The streptococcus pneumoniae is the most common bacterium that causes bacterial pneumonia. Many other bacteria may cause bacterial pneumonia including group B streptococcus, staphylococcus aureus, and Group A streptococcus. Bacterial pneumonia may have a quick onset and the following symptoms may occur: productive cough, pain in the chest, vomiting or diarrhea, decrease in appetite, fatigue, fever.

Viral pneumonia. This is caused by various viruses, including respiratory syncytial virus, or RSV (most commonly seen in children under age 5), parainfluenza virus, influenza virus, and adenovirus. Early symptoms of viral pneumonia are the same as those of bacterial pneumonia. However, with viral pneumonia, the respiratory involvement happens slowly. Wheezing may occur

and the cough may worsen. The World Health Organization and UNICEF report that acute respiratory infection continues to be a leading cause of mortality in young children; in 2000 it killed approximately 2 million children under the age of 5 in developing countries. About 40% of these cases are due to viral infections. Pneumonia, a respiratory disease characterized by inflammation of the lung parenchyma, is usually caused by viruses, bacteria, or irritants. The term pneumonia refers to infection of the lung parenchyma and excludes the tissues of the airway such as the bronchi. However, acute viral lower respiratory tract infections in children are thought to affect all of the epithelial cells lining the airway, from the nasopharynx to the alveolar bed. Therefore, viral pneumonia is often a component of a more generalized respiratory tract infection syndrome. However, studies conducted during the last several decades have struggled to define precise quantitative models for the incidence of these diseases. Most large studies have been conducted in hospitals and thus lacked a known denominator of patients at risk. These studies also vary by differences in geographic location of the study, type of hospital, age of the patients, season, criteria for admission, severity of disease, and number and type of diagnostic tests performed. The relatively new use of molecular diagnostic tests has increased our ability to diagnose virus infection, but comparison of data from these studies with data from cell culture–based studies is problematic. The etiologic agents that cause viral pneumonia are well defined. The cause of viral pneumonia varies depending on the age of the child, the setting in which the virus was acquired, the season, and the presence of medical or environmental risk factors. Although a very long list of viruses has been reported to cause pneumonia, the astute clinician can narrow the cause to a short list of potential agents using a careful medical history and physical examination. Common causes of viral pneumonia: CMV, HSV types I and II, enteroviruses, rubella, RSV, subgroups A and B, RSV subgroups A and B, Coronaviruses SARS-Coronavirus, Epstein-Barr virus, CMV, human herpesvirus 6 (in the immunocompromised), Varicella-zoster virus, Developing world: measles virus, mumps viruses, Endemic areas: Hantavirus.

Risk factors for viral pneumonia: most children are infected with the common respiratory viruses during the first years of life, but a minority suffers from lower respiratory tract disease or pneumonia to such an extent that it brings them to medical care. Studies have identified a number of risk factors for severe disease, especially young age, prematurity, preexisting lung disease (especially bronchopulmonary dysplasia), congenital heart disease, environmental exposure (smoking or wood fire heating), daycare, large number of siblings, low socioeconomic status, or birth near the start of the RSV season. Exposures to infected children in the home or nosocomial exposure are pertinent historical risk factors.

Pathogenesis: viral pneumonia is an infection of the cells surrounding the alveolar space. Alveolar walls thicken, and the alveolar space becomes occluded with exudates, sloughed cells, and activated macrophages. The clinical disease is distinguished by poor air exchange, first noted by

poor oxygen intake (as detected by pulse oximetry or blood gas measurement) followed by CO_2 retention. The physiology of the disease reflects an inflammatory process resulting in an alveolar-capillary block that interferes with gas exchange, resulting in elevation of the alveolar-arterial Po_2 difference. Many cases of viral pneumonia in young children are also accompanied by inflammation of the bronchioles, and air trapping contributes to the poor level of gas exchange. Children compensate for respiratory compromise better than do adults, generally by increasing the respiratory rate. Children show a remarkable resilience when faced with respiratory compromise, even though their airways exhibit a much higher intrinsic level of resistance. Unrelieved tachypnea, however, can lead to exhaustion and respiratory failure. The histopathologic mechanisms underlying acute viral pulmonary disease in otherwise healthy children are not completely understood, because lung tissue is rarely obtained for histology before mechanical ventilation or other medical interventions in previously healthy patients. The clinical presentation of viral pneumonia is related principally to disease in the respiratory tract, including increased respiratory rate and supracostal, intercostal, or subcostal retractions. Infants show nasal flaring, grunting, and marked retractions during severe disease. Vital signs reveal fever in about half of cases at presentation; fever higher than 103°F is much less common than in bacterial pneumonia but can occur. Systemic toxicity is less common than with bacterial infection, because respiratory viruses (other than measles virus) rarely cause viremia. Of the conventional respiratory viruses, influenza virus is the one that most frequently causes high fever and toxic appearance. Respiratory failure, heralded by a change in alertness due to hypoxia and CO_2 retention or decreased respiratory effort due to exhaustion, requires immediate action. Physical examination reveals crackles on auscultation, generally more prominent on inspiration. RSV disease in infants is commonly a mixed presentation of bronchiolitis and pneumonia, in which case expiratory wheezing is present in addition to inspiratory crackles. The viruses that cause pneumonia also cause upper respiratory tract infection. Therefore, concomitant coryza is common, complicated in about a third of cases with otitis media. Nasal obstruction caused by purulent nasal secretions contributes to the respiratory distress, especially in infants. Mild to moderate dehydration is common as a result of increased respiratory and insensible losses, and poor oral fluid intake.

Differential diagnosis: the differential diagnosis for nonviral causes varies by age. In newborns, group B streptococcus infection and hyaline membrane disease are the most common considerations. In infants, atypical organisms such as Chlamydia trachomatis and Ureaplasma urealyticum must be considered, as well as Pneumocystis carinii in children with immunodeficiencies or in utero exposure to human immunodeficiency virus. Common bacterial causes of pneumonia are Bordetella pertussis, Streptococcus pneumoniae, Haemophilus influenzae (mostly nontypable species in the era of universal immunization against type B), and mycobacterial infections including tuberculosis. In young children, Mycoplasma pneumoniae, S. pneumoniae, and

mycobacterial infections are important. In older children and adolescents, the atypical organisms M. pneumoniae, C. trachomatis, and Chlamydia pneumoniae remain important, and the bacteria S. pneumoniae, B. pertussis, and mycobacterial species are considerations. Histoplasma capsulatum infection is relatively common in certain areas of the United States and causes an atypical pneumonia. Cryptococcus neoformans infection is also a consideration in immunocompromised patients. Many published studies have addressed the differentiation of bacterial from viral pneumonia using clinical, radiologic, and routine hematologic tests, but these methods have not been found to be sufficiently reliable in differential diagnosis.

Chest radiographic findings, total white blood cell count, erythrocyte sedimentation rate, and serum C-reactive protein have been used widely in children with community-acquired pneumonia of varying etiology to discriminate between bacte-rial causes, but the specificities of these are not sufficient to determine the diagnosis in clinical practice. Lymphocytic predominance is usually present in the peripheral blood white blood cells during viral pneumonias, although this feature is also usually present in pertussis and atypical bacterial infections. Bacterial pneumonia requiring hospitalization on average causes higher fevers than viral pneumonia, and is more often associated with a fever higher than 103°F than is viral pneumonia. A lobar, segmental, or rounded well-defined pneumonia affecting a single lobe is more likely to be bacterial in etiology, as are cases associated with large pleural effusions, abscess, bullae, or pneumatoceles. A bedside cold agglutinins test may be positive in the case of viral pneumonia or mycoplasmal infection, and thus this test is not particularly helpful in distinguishing etiology.

Labaratory diagnosis of viral pneumonia: the specific cause of viral pneumonia can be identified by several methods with varying levels of stringency. Culture of virus in cell monolayer cultures is considered the gold standard. Viruses are identified by characteristic cytopathic effect and confirmed by immunodetection using virus-specific antibodies and fluorescence detection. Culture techniques require a high level of expertise and generally are best performed on fresh specimens, such as secretions obtained by nasopharyngeal aspiration or nasopharyngeal swab. Rapid diagnostic tests for RSV and influenza A and B based on the immunodetection of viral proteins in nasopharyngeal secretions are widely used, but their positive predictive value is most appropriate for use during epidemics when the prevalence of positive tests is expected to be high. Antigen detection tests are not sensitive enough to determine that a hospitalized patient is no longer shedding infectious virus; therefore, negative tests should not be used to justify termination of contact precautions in a patient with viral pneumonia. Increasingly, clinical detection of viruses is being performed by molecular genetic techniques, such as reverse transcriptase–polymerase chain reaction followed by hybridization or sequence analysis. This technique identifies the presence of viral nucleic acid. Polymerase chain reaction tests tend to be more sensitive than cell culture during the period of viral clearance (1–3 weeks after infection). It is not clear how long viral RNAs are present

following active infections, but evidence to date shows that they may persist for weeks or months even when virus can no longer be cultured. Therefore, a positive polymerase chain reaction–based test must be used with caution, because in some cases it is possible that a positive test obtained during an acute pneumonia is actually related to a recent infection. Serology is helpful to diagnose or confirm infection, particularly in the clinical research setting. A fourfold rise in serum antibodies against a virus between the preinfection period and after infection, particularly when a serology testing functional antibodies is used, suggests a specific diagnosis. In practice, the use of serologic tests to diagnose the cause of pneumonia is difficult because the rise in antibodies in young children may not achieve a significant level until 6 to 8 weeks or more have passed.

Most infants and children with mild viral pneumonia can be treated symptomatically as outpatients. Oxygen is required if there is grunting, flaring, severe tachypnea, and retractions, or if pulse oximetry indicates oxygen saturation below 90% to 92%, or arterial blood gas measurement indicates depressed Po_2 (<60–70 mm Hg). Retention of CO_2 is particularly concerning, especially in the face of tachypnea. Severe respiratory distress, hypoxia, and dehydration are among the indications for hospitalization. Care in the hospital is principally supportive, such as the delivery of supplemental oxygen and intravenous fluids, and the use of mechanical ventilation in the case of respiratory failure. The youngest infants with RSV pneumonia may require monitoring for the risk of apnea, although apnea usually presents near the beginning of the illness. Chest physiotherapy and mucolytics may be of value, but their efficacy is uncertain in viral pneumonia. If a specific viral diagnosis is made early in the course of illness, there are some antiviral medications available. Licensed drugs for influenza infection include the M2 ion-channel inhibitors amantidine and rimantidine, and the neuraminidase inhibitors oseltamivir and zanamivir. These antiviral compounds work best when therapy is initiated in the first days of infection and are particularly relevant for those with immunosuppression or preexisting cardiopulmonary disease. Ribavirin delivered as an aerosol is licensed for treatment of severe RSV infection, but recent studies have questioned its value. Most centers do not routinely treat otherwise healthy infants with RSV pneumonia with ribavirin. RSV intravenous immune globulin and palivizumab, an intramuscular injectable humanized monoclonal antibody directed against the RSV fusion protein, are available for prophylaxis against RSV disease and are indicated for children with chronic cardiopulmonary disease and other serious risk factors. Clinical trials of therapy of acute disease using these antibody preparations, however, have not shown this treatment to be effective during hospitalization. Antibiotic therapy does not improve the outcome in viral pneumonia and has not been shown to alter the risk of bacterial complication of viral pneumonia as a superinfection. Indiscriminate use of antibiotics in the setting of viral infection causes the selection of antibiotic-resistant bacteria. If secondary infection does occur, usually in hospitalized patients in intensive care units, the selected infecting bacterium may not be susceptible to conventional antibiotics. Therefore, specific diagnosis

of the etiology of severe pneumonia suspected to be of viral etiology is warranted even when an antiviral therapeutic option is not anticipated, so as to minimize inappropriate antibiotic exposure.

Mycoplasma pneumonia. Mycoplasma pneumoniae is one of the few species of Mycoplasma that frequently cause infection in humans. M. pneumoniae predominantly causes respiratory tract infection but has a wide variety of clinical manifestations. The clinical features, diagnosis, and treatment of M. pneumoniae infection in children will be reviewed here. M. pneumoniae infection in adults, Mycoplasma genitalium, Mycoplasma hominis, and Ureaplasma urealyticum infections are discussed separately. Symptoms of mycoplasma pneumonia in young children: children younger than 5 years old who get M. pneumoniae infection could have symptoms that are different from older children and adults. Instead, they may have the following symptoms: sneezing, stuffy or runny nose,sore throat, watery eyes, wheezing, vomiting, diarrhea.

In conclusion, we can say that to preventpneumonia,_you can take a few steps to try and prevent it. Vaccines can help prevent some types of pneumonia. Good hygiene (washing your hands often), quitting smoking, and keeping your immune system strong by getting regular physical activity and eating healthy are other ways to lower your risk of getting pneumonia.

Reference:

1. Alimova, I. (2021, January). BOLA TARBIYASIDA OTA-ONALARNING PSIXOLOGIK BILIMLARNI SHAKLLANTIRISHNING AHAMIYATI. In INTERNATIONAL CONFERENCES ON LEARNING AND TEACHING (Vol. 1, No. 1, pp. 131-132).
2. Anvarovna, A. I. (2022). PNEUMONIA IN 1-YEAR-OLD CHILDREN: SYMPTOMS, TREATMENT AND PREVENTION.
3. Алимова, И. А., & Пулатов, Р. (2022). СОВЕРШЕНСТВОВАНИЕ СЛУЖБЫ РАННЕЙ МЕДИКО-РЕАБИЛИТАЦИОННОЙ, ПСИХОЛОГО-ПЕДАГОГИЧЕСКОЙ, СОЦИАЛЬНО-ПРАВОВОЙ ПОМОЩИ ДЕТЯМ С ОСОБЫМИ ПОТРЕБНОСТЯМИ. Новости образования: исследование в XXI веке, 1(4), 220-227.
4. Алимова, И. А., Ахмедова, М. М., Абдухалилова, Г. М., & Пулатов, Р. (2022). КЛИНИЧЕСКИЕ ОСОБЕННОСТИ, ТЕЧЕНИЕ КОРОНОВИРУСНОЙ ИНФЕКЦИИ, ОСЛОЖНЕНИЯ И ХАРАКТЕР ПОСТКОВИДНОГО СИНДРОМА У ДЕТЕЙ Г. ФЕРГАНЫ. Scientific Impulse, 1(4), 973-981.
5. Ахмедова, М. М. (2023, June). РАСПРОСТРАНЕННОСТЬ СТРУКТУРЫ И ФАКТОРЫ РИСКА РАЗВИТИЯ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ ФЕРГАНСКОЙ ДОЛИНЕ. In INTERDISCIPLINE INNOVATION AND SCIENTIFIC RESEARCH CONFERENCE (Vol. 1, No. 10, pp. 5-11).
6. Анваровна А.И., Мелибаевна Б.Х., Максамаджоновна Р.З., Захриддиноич И.Б., Исломкулович У.М. (2023). Актуальность внедрения службы комплексного раннего вмешательства в семейных клиниках. BioGecko Журнал новозеландской герпетологии , 12 (03), 1139-1145.
7. Анваровна А.И., Махамаджоновна Р.З. (2023). Физическая реабилитация и реабилитация детей с ДЦП, организация психологической службы поддержки родителей. Техасский журнал медицинских наук , 18 , 6-12.
8. Алимова, И. А. Пулатов Рузимухаммад//СОВЕРШЕНСТВОВАНИЕ СЛУЖБЫ

РАННЕЙ МЕДИКО-РЕАБИЛИТАЦИОННОЙ, ПСИХОЛОГО-ПЕДАГОГИЧЕСКОЙ, СОЦИАЛЬНО-ПРАВОВОЙ ПОМОЩИ ДЕТЯМ СОСОБЫМИ ПОТРЕБНОСТЯМИ. Международный научный журнал «Новости образования: исследованиев XXI веке, 4(100), 220-227.

9. Ахмедова, М. М., & Райимова, З. М. (2023). РЕГИОНАЛЬНЫЕ ОСОБЕННОСТИ РАСПРОСТРАНЕННОСТИ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ ПО ДАННЫМ СТАЦИОНАРОВ ГОРОДА ФЕРГАНЫ ЗА 10 ЛЕТ (2007-2016гг.). FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES, 2(20), 167-172.
10. Анваровна А.И., Махамаджоновна Р.З. (2023). ТЕХНОЛОГИИ РАННЕГО ВМЕШАТЕЛЬСТВА И МЕДИЦИНСКИЕ НАВЫКИ У ДЕТЕЙ С ПЕРИНАТАЛЬНОЙ ЭНЦЕФАЛОПАТИЕЙ. Всемирный бюллетень социальных наук , 18 , 76-78.
11. Anvarovna, A. I., & Melibaevna, B. K. (2022). JUVENILE IDIOPATHIC ARTHRITIS. SCIENTIFIC JOURNAL OF RESEARCH IN MEDICINE (SJRM), 1(4), 6-8.
12. Рапиков, И. Г. (2019). Роль народных подходов к учащимся начальной школы на основе труда, экономики и предпринимательства. доктора/кандидата наук предлагаем вступить в редакционную коллегию журнала (подробности на сайте), 90.
13. Rapikov, I. (2020). SCHOLARS'VIEWS ON THE FORMATION OF SAVINGS AND ENTREPRENEURSHIP ON THE BASIS OF LABOR EDUCATION IN PRIMARY SCHOOL STUDENTS. Scientific and Technical Journal of Namangan Institute of Engineering and Technology, 2(11), 309-313.
14. Pulatova, Z., & Ganijonov, H. (2023, June). MODERN VIEWS OF BEHAVIORAL CHANGES IN 16-17-YEAR-OLD STUDENTS. In International Conference on Education and Social Science (Vol. 1, No. 2, pp. 30-32).
15. Jalolidinovna, I. Z. Cellular Changes in Cardiomyocytes Due to Ischemia and Necrosis. JournalNX, 7(04), 1-2.
16. Ахмедова, М. М., & Райимова, З. М. (2023). РЕГИОНАЛЬНЫЕ ОСОБЕННОСТИ РАСПРОСТРАНЕННОСТИ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ ПО ДАННЫМ СТАЦИОНАРОВ ГОРОДА ФЕРГАНЫ ЗА 10 ЛЕТ (2007-2016гг.). FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES, 2(20), 167-172.
17. Anvarovna, A. I., Melibayevna, B. X., Maxamatjonovna, R. Z., Zaxriddinoich, I. B., & Islomkulovich, U. M. (2023). The Urgency of Introducing the Service of Complex Early Intervention in Family Clinics. BioGecko A Journal for New Zealand Herpetology, 12(03), 1139-1145.
18. Ахмедова, М. М. (2023, June). РАСПРОСТРАНЕННОСТЬ СТРУКТУРЫ И ФАКТОРЫ РИСКА РАЗВИТИЯ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ ФЕРГАНСКОЙ ДОЛИНЕ. In INTERDISCIPLINE INNOVATION AND SCIENTIFIC RESEARCH CONFERENCE (Vol. 1, No. 10, pp. 5-11).
19. Melibayevna, B. X. (2023). Measures to Improve the Quality of Life of Patients with Comorbid Heart Pathology and Increase the Effectiveness of Their Treatment. Scholastic: Journal of Natural and Medical Education, 2(3), 34-36.
20. N-A, O. I. X., LI, V., & ST K, S. I. OILA.
21. Райимова, З. М., Холматова, Е. Н., Эшонов, Р. М., & Умирзаков, О. Э. (2021). БОРЬБА С НОВОЙ ЭПИДЕМИЕЙ КОРОНАВИРУСА ВО ВСЕМ МИРЕ И В УЗБЕКИСТАНЕ. Экономика и социум, (4-2 (83)), 328-331. (9)
22. Ахмедова, М. М., & Райимова, З. М. (2023). РЕГИОНАЛЬНЫЕ ОСОБЕННОСТИ

РАСПРОСТРАНЕННОСТИ АЛЛЕРГИЧЕСКИХ ЗАБОЛЕВАНИЙ У ДЕТЕЙ ПО ДАННЫМ СТАЦИОНАРОВ ГОРОДА ФЕРГАНЫ ЗА 10 ЛЕТ (2007-2016гг.). FORMATION OF PSYCHOLOGY AND PEDAGOGY AS INTERDISCIPLINARY SCIENCES, 2(20), 167-172. (4)

23. Алимова, И. А., Райимова, З. М., Бабаджанова, Х. М., & АКТУАЛЬНОСТЬ, В. (2022). РАННЕГО ВМЕШАТЕЛЬСТВА В СЕМЕЙНЫЕ ПОЛИКЛИНИКИ ДЕТЯМ РАННЕГО ВОЗРАСТА. JOURNAL OF CLINICAL AND PREVENTIVE MEDICINE, 2, 5-11.
24. Anvarovna, A. I., & Mahamatjonovna, R. Z. (2023). Physical rehabilitation and Rehabilitation of Children with Cerebral Palsy, Organization of Psychological Services Parent Support. Texas Journal of Medical Science, 18, 6-12. (2)
25. Ахмедова, М. М., Шерматов, Р. М., Алимова, И. А., & Райимова, З. М. (2023). Особенности клинико-функциональной диагностики и терапии детей страдающих аллергическими заболеваниями. Бюллетен ассоциации врачей Узбекистана, 1, 59-63. (2)
26. Anvarovna, A. I., Melibayevna, B. X., Maxamatjonovna, R. Z., Zaxriddinoich, I. B., & Islomkulovich, U. M. (2023). The Urgency of Introducing the Service of Complex Early Intervention in Family Clinics. BioGecko A Journal for New Zealand Herpetology, 12(03), 1139-1145. (2)
27. Райимова, З. М., & Пўлатова, М. Р. (2022). КАРИНДОШЛАР УРТАСИДАГИ НИКОХДАН КЕЛИБ ЧИКУВЧИ ГЕНЕТИК КАСАЛЛИКЛАР. Новости образования: исследование в XXI веке, 1(1), 172-175.
28. Rayimova, Z. M., & Ibragimov, O. B. INTERNAL DISEASES. PATHOLOGY OF INTESTINE. СБОРНИК, 229.