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Review Article

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# Diagnosis of Pediatric Pneumonia -A Review

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**Keywords**

Diagnosis,
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**Abstract**

**Introduction:** Pneumonia is an inflammation in the lung parenchyma. Acute lower respiratory infections, and especially pneumonia, cause 20% of deaths in children. In developing countries, 12 to 20 children out of each 1000 live-born children die before reaching the age of 5 due to developing pneumonia. Pneumonia is the most common cause of death as a result of infection in America. The signs and symptoms of pneumonia varies depending on the type of pathogen, the patient's age, and the severity of the disease, in a way that in little infants symptoms may be non-specific with little clinical findings.

**Materials and Methods:** The present study searches were conducted Google scholars, science direct pub med, ISI, PsycINFO and Web of Science. Keywords used in this research are: pneumonia, diagnosis, pediatric. At first 100 studies were conducted on the search for various information bases Among them, studies that did not have criteria for entering the study were excluded from the study and Finally, were used the 20 studies that were more consistent with the subject of this study. In this study contents related to pediatric pneumonia are discussed .

**Discussion:** There are a lot of determinants that determine how likely it is to contact the etiologic agent of pneumonia, respond to a dangerous respiratory infection or even lead to death, some of which are related to the child, such as age, gender, underlying illness. Some factors also relate to the disease itself, such as the type of infection and the severity of the infection. Other factors may also be related to the child's, family and economic environment, health care system and type of care.

## Introduction

Pneumonia is an inflammation in the lung parenchyma. Acute lower respiratory infections, and especially pneumonia, cause 20% of deaths in children. In developing countries, 12 to 20 children out of each 1000 live-born children die before reaching the age of 5 due to developing pneumonia (1) . Pneumonia is the most common cause of death as a result of infection in America. The signs and symptoms of pneumonia varies depending on the type of pathogen, the patient's age, and the severity of the disease, in a way that in little infants symptoms may be non-specific with little clinical findings. In a study by Soleimani et al., cough, fever, tachypnea, and dyspnea were reported to be the most common clinical symptoms of pneumonia (2). In a study in Brazil, the main symptoms of pneumonia in the hospitalized patients were reported to be tachypnea and intercostal retraction. The pathogens causing the disease are viruses, bacteria, and fungi. The main viruses causing pneumonia in children include respiratory syncytial virus, influenza, and rhinoviruses (3). The most common bacterial causes in normal children under the age of five without any underlying diseases are first streptococcus pneumonia and then haemophilus influenzae. Also, nonpathogenic factors such as food aspiration, allergies, and medicine can cause pneumonia. Environmental factors such as going to the kindergarten, being exposed to cigarette smoke,

low socio-economic status, and overpopulation can increase the likelihood of developing pneumonia (4). However, in most of the cases a specific pathogen is not found for pneumonia in children. In a study in America as a developed country, the most common causes of pneumonia in children were reported to be streptococcus pneumonia, mycoplasma pneumonia, and chlamydia. Acute respiratory infections are among the most common infections during childhood, in a way that every child under the age of five develops this type of infection 4 to 8 times a year, and these infections affect two billion children around the world every year (5). The results of studies show that these infections are the reason for 30 to 60 percent of children's visit to healthcare centers and 30 to 40 percent of hospitalization cases in children's hospitals. The World Health Organization estimated the mortality rate in children under the age of five who die as a result of acute respiratory diseases (other than the cases caused by measles, pertussis, and death during infancy) to be around 2.1 million children in the year 2004. Generally, the mortality rate in higher in childhood and especially in infants under the age of one year old. However, the rate decreases dramatically after the age of five (6). In developing countries, most deaths occur in infants under the age of two months, and almost all cases are due to acute pneumonia. In developing countries, the most common factors causing pneumonia in children are streptococcus pneumonia, haemophilus influenzae, and other respiratory viruses,mycobacterium tuberculosis, staphylococcus aureus, and gram-negative bacteria. However, it should be noted that in a considerable number of cases no specific pathogen is found for pneumonia in children. The results of studies show that in developing countries, in a study conducted in 2004 in America, the most common factors for pneumonia in children are streptococcus pneumonia, mycoplasma Pneumonia, and chlamydia pneumonia.

## Materials and Methods

The present study searches were conducted Google scholars, science direct pub med, ISI, PsycINFO and Web of Science. Keywords used in this research are: pneumonia, diagnosis, pediatric. At first 100 studies were conducted on the search for various information bases Among them, studies that did not have criteria for entering the study were excluded from the study and Finally, were used the 20 studies that were more consistent with the subject of this study. In this study contents related to pediatric pneumonia are discussed.

## Important etiological factors in pediatric pneumonia

### Viruses

Viruses are the most common causes of pneumonia in younger children; as the people age, the prevalence rate of viral pneumonia decreases significantly. The major viral causes of pneumonia in children are RSV, influenza and retinoic viruses. Other factors, such as adenoviruses, par influenza, Enter viruses and coronaviruses are included in the following rank. Recently, human Hemoplatinase Metopenomy (HMPV) is also considered as an important cause of viral pneumonia. However, the virus of measles, as one of the most severe sources of viral pneumonia is being comprehensively fought against through vaccination in the country (7).

### *Streptococcus pneumonia:*

Pneumococcus is the most common cause of bacterial pneumonia in all stages of human life, except the neonatal period. Pneumococcus usually presents as a typical local pneumonia, but it can be seen in other forms, such as pneumonia with ejection or interstitial pneumonia. The routine use of Pneumococcus seven-volume vaccine has been associated with a reduction in pneumonia, for example, in some advanced countries, the prevalence of proven radiologic pneumonia has decreased by up to 35% (8).

### *Haemophilus influenza*:

Another major cause of bacterial pneumonia, especially in children under the age of 5 years, is the clinical manifestations of pneumococcus pneumonia, which is characterized by varying symptoms of mild infections. Due to the use of conjugated *Haemophilus influenza* type B vaccine in advanced countries, invasive infections such as pneumonia have diminished significantly. Of course, nontypable hemophilia influenza is still a major cause of pneumonia in these countries, and especially in developing countries. (9)

### *Staphylococcus aureus*:

Pneumonia caused by this virus usually occurs in the early stages of infancy and is usually followed by an early viral infection, especially the influenza virus. Pneumonia is usually severe, with a sudden onset of progress, and with amputee and abscess, and the

formation of disrupted pneumatocles in the lung. In older children, the radiological clinical course may not be different from other bacterial causes. 75% of the initial cases of this type of pneumonia are caused by an underlying problem in the child, of which 65% are unilateral and observed mainly under the age of one. The second is usually bilateral, due to the spread of infection from another location to the lungs(10).

### Streptococcus Group A:

Pneumonia caused by this microbe is rare in children. It is characterized by a large necrosis of the mucous membrane of the respiratory tract associated with edema and bleeding, which causes prolonged fever in these patients for days with proper treatment.

In most of the cases, pneumonia is caused by micro-organisms. However, some non-infection factors, which are not limited, also cause pneumonia. Non-infection factors include inflammatory processes (systemic lupus erythematous, sarcoidosis, and histocytosis) and inhalation or the aspiration of several toxic substances (hydrocarbons, cigarette smoke, molds, dust, chemical substances, and the contents of stomach). Also, food aspiration or stomach acid, external object, hydrocarbons and lipoid substances, hypersensitivity reactions, medicine, and radiation can cause pneumonia. Based on an anatomical classification, pneumonia can divided into the following types: lobar, bronchopneumonia, alveolar, and interstitial. By definition, lobar pneumonia is limited to one or more than one pulmonary lobes, which can be accompanies by complete contraction of one or more than one lobes.

Interstitial pneumonia refers to the inflammation of interstitial tissues, namely alveolar walls, ducts, pathways, and bronchioles. However, the classification of pneumonia based on etiology is more related to its diagnosis and treatment (11).

## Discussion

In most cases, finding responsible organisms is not necessary in community-acquired pneumonia (CAP); pneumonia is clinically diagnosed and determining responsible microorganisms is necessary only in case of severe pneumonia and fuminal infection, pneumonia associated with anemia or pulmonary abscess, cases of progressive pneumonia that do not respond to initial treatment, and patients with underlying illness (12). Sputum removal in children, especially under 6 years of age, is usually difficult. Occasionally, however, hyperplastic nebulizers containing hypertonic saline can be used to get rid of sputum in children. A sputum sample is practically useful when the number of white blood cells (PMN) more than 10 and less than 25 epithelial cells per field Stereoscopic microscope 10 (LPF) (13).

Preparation of a sample of nasopharyngeal secretions to evaluate the antigen or culture of microorganisms due to the probability of natural colonization in the area is not reliable and is used only in certain cases, such as some viral infections (14). Typical samples from the throat and oropharynx are usually used to determine the etiological factor of pneumonia. Using invasive methods, such as bronchoscopy, lavage Broncho alveolar preparation, lung closure or open-pulmonary biopsy in certain cases, are suggested as standard gold tests. Sometimes it is necessary to implement definitive diagnosis and proper treatment (15). Pelvic blood or pleural fluid may also be helpful in the presence of pleural effusion. Finding germs in the blood present high specificity high but low sensitivity, as only about 15% of bacterial pneumonia are positive for blood culture. Therefore, blood culture in each child is recommended with a possible diagnosis of bacterial pneumonia. Serologic tests for the detection of some microorganisms Humanald Mycoplasma pneumonia and Chlamydia Pneumonia is used and a delay test is usually required to evaluate the increase in antibody titer; therefore, diagnosis become retrospective and serological tests in children under 6 years are less reliable due to low immunological response and transmission of antibodies to the mother. Simple test of immune-chromatography tape to find bacterial polysaccharide in urine in adults is an acceptable and fast test in the diagnosis of pneumonia, while this test is not reliable in children due to false positives resulting from thrombosis and nasopharyngeal colonization in children, especially in developing countries, where about 60-90% of children carry a pneumococcal in their throat.

Pneumonia is divided into two categories based on the source of the infection.

- Pneumonia acquired from the community with lower antibiotic resistance due to the origin of the disease.
- Pneumonia acquired from the hospital which, due to the hospital's origin, is associated with more antibiotic resistance.

The highest mortality rate occurs in patients requiring hospitalization due to acquired pneumonia, with a 30-day mortality rate of 23% in such patients. On the other hand, mortality rate is 28% for other reasons after one year.

The etiology of this type of pneumonia varies depending on the geographic region and is caused by several infectious agents; however, Streptococcus pneumonia is the most common cause of pneumonia in the world.There are a lot of determinants that determine how likely it is to contact the etiologic agent of pneumonia, respond to a dangerous respiratory infection or even lead to death, some of which are related to the child, such as age, gender, underlying illness. Some factors also relate to the disease itself, such as the type of infection and the severity of the infection. Other factors may also be related to the child's, family and economic environment, health care system and type of care (16).

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