Bacterial pneumonia in children: Risk factors, symptoms, treatments and diagnoses

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ABSTRACT

The present research aimed to analyze the main risk factors associated with bacterial pneumonia in children, the most common symptoms presented by pediatric patients affected by this infection, as well as the main methods used for the diagnosis and treatment of this condition. To achieve this, a bibliographic research was conducted, and as a result, it was found that bacterial pneumonia in children can be severe if not properly treated. Risk factors such as age, lack of immunization, unfavorable socioeconomic conditions, and exposure to passive smoking are associated with this condition. The diagnosis of such an illness involves clinical evaluation and complementary tests, such as chest radiography. Treatment, on the other hand, includes the use of prescribed antibiotics, rest, and adequate hydration.

Keywords: Bacterial pneumonia, Children, Health.

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INTRODUCTION

Bacterial pneumonia is, according to Hatisuka et al. (2015), a common lung infection in children that can be caused by several types of bacteria. It is, therefore, a serious condition that can lead to serious complications and, in some cases, even death. Bacterial pneumonia predominantly affects the respiratory system and occurs when bacteria invade the lungs, causing inflammation in the lung tissues and filling the alveoli with fluid and pus.

The incidence of bacterial pneumonia in children is significant and represents a public health challenge. According to data from the World Health Organization - WHO (2022), pneumonia is responsible for a high rate of infant morbidity and mortality worldwide, being the leading cause of death for children under five years of age in low- and middle-income countries.

Children are especially vulnerable to bacterial pneumonia due to their still-developing immune systems. Children's immune systems are not as effective as adults, making them more susceptible to bacterial infections. In addition, factors such as close contact in school or daycare settings, exposure to viral respiratory infections, lack of breastfeeding, and malnutrition can increase the risk of developing this condition (ASSUNÇÃO; PEREIRA; ABREU, 2018).

Among the bacteria known to cause pneumonia in children, Streptococcus pneumoniae, Haemophilus influenzae and Staphylococcus aureus stand out. These bacteria can be transmitted through respiratory droplets, when an infected person coughs or sneezes, or through direct contact with contaminated surfaces. The spread of these bacteria in environments with high population density, such as schools and daycare centers, contributes to the spread of infection among children (SILVA, 2011).

Given the relevance of the topic and the impact of bacterial pneumonia on children's health, it is essential to understand the main risk factors associated with this infection, the symptoms presented by affected children, and the appropriate diagnosis and treatment strategies. This information is essential for the prevention, early diagnosis, and effective therapeutic approach of bacterial pneumonia in children.

In this context, this study aims to analyze the main risk factors associated with bacterial pneumonia in children, the most common symptoms presented by pediatric patients affected by this infection, as well as the main methods used for the diagnosis and treatment of this condition.

To this end, a bibliographic research was used, which is, according to Gil (2011), a research method that is based on the consultation and analysis of secondary sources, such as books, scientific articles, theses, dissertations and technical reports, in order to obtain relevant information on the topic in question. In this study, several bibliographic sources were consulted, such as books specialized in pediatric infectious diseases, scientific journals in the medical field, as well as documents and reports

from internationally recognized health organizations, such as the WHO and the Centers for Disease Control and Prevention (CDC).

It is hoped that the results of this research can help in the development of more effective clinical guidelines and protocols in the early diagnosis and appropriate treatment of bacterial pneumonia in children, aiming at a more assertive and personalized approach. The relevance of this study extends not only to health professionals, such as pediatricians, nurses and researchers, but also to public managers and society in general. Raising awareness about bacterial pneumonia in children and disseminating scientific knowledge can contribute to the implementation of more effective health policies in order to reduce the incidence and impact of this disease in the child population.

DEVELOPMENT

BACTERIAL PNEUMONIA IN CHILDREN: HISTORICAL CONTEXTUALIZATION

Bacterial pneumonia in children is an acute respiratory infection that affects the lungs and is caused by bacteria. It is a common condition, particularly in children under the age of five. The most commonly involved bacteria are Streptococcus pneumoniae (pneumococcus), Haemophilus influenzae type b (Hib), and Staphylococcus aureus (NUNES et al., 2017).

According to Amorim et al. (2012), bacterial pneumonia in children is a condition that has been known and studied for decades. Throughout history, several bacteria have been identified as causing the infection, and advances in diagnosis and treatment have contributed to reducing the morbidity and mortality associated with this disease.

In the nineteenth century, pneumonia was one of the leading causes of death in children, mainly due to a lack of knowledge about the bacterial nature of the disease and the absence of effective antibiotics. Bacterial pneumonia was often associated with poor hygiene, overcrowding, and malnutrition, which contributed to the spread of infection (AMORIM et al., 2012).

Hatisuka et. al (2015) emphasizes that in the early twentieth century, with advances in microbiology and understanding of infectious diseases, scientists began to identify the specific bacteria responsible for pneumonia. The development of culture and staining techniques has allowed for more accurate identification of bacterial agents, such as Streptococcus pneumoniae and Haemophilus influenzae, which have become important targets for treatment.

With the advent of antibiotics such as penicillin in the 1940s, the treatment of bacterial pneumonia in children took a significant leap forward. The ability to effectively fight the bacteria that cause the infection has led to a significant reduction in mortality and the number of complications associated with the disease. Over the following decades, new treatment options were developed, as well as specific vaccines to prevent infections caused by certain bacterial strains. This has helped to

further reduce the incidence of bacterial pneumonia in children and improve treatment outcomes (ASSUNÇÃO; PEREIRA; ABREU, 2018).

In the most recent historical context, awareness of the importance of vaccination and prevention measures, along with improvements in health conditions and access to medical care, has contributed to the decrease in the incidence and severity of bacterial pneumonia in children. Importantly, despite advances, bacterial pneumonia in children still poses a challenge to health systems, especially in areas with limited resources and vulnerable populations. Bacterial resistance to antibiotics is also a growing concern, requiring integrated approaches and effective prevention strategies (SILVA, 2011).

MAIN RISK FACTORS ASSOCIATED WITH BACTERIAL PNEUMONIA IN CHILDREN

Rocha et al. (2022) highlight that bacterial pneumonia is a lung infection caused by bacteria that mainly affects children and can be serious if not treated properly. There are several risk factors that increase children's susceptibility to this infection.

One of the main risk factors is age. Infants and young children have a developing immune system, which makes it harder for the body to fight off the bacteria that cause pneumonia. In addition, the lack of prior exposure to these bacterial pathogens also contributes to children's vulnerability (ROCHA et al., 2022).

Silva (2011) points out that the lack of adequate immunization can also increase the risk of bacterial pneumonia in children. Vaccination is a crucial measure to prevent infections caused by bacteria, such as Streptococcus pneumoniae and Haemophilus influenzae type b. Children who have not received all the recommended doses of vaccines are more susceptible to developing bacterial pneumonia.

Unfavorable socioeconomic conditions may increase the risk of bacterial pneumonia in children. Environments with lack of access to clean water, poor sanitation, and overcrowding facilitate the spread of bacteria that cause respiratory infections, including pneumonia. In addition, malnutrition also weakens the immune system, leaving children more susceptible to bacterial infections (SILVA, 2011).

Other risk factors include, according to Raposo et al. (2019), exposure to secondhand smoke, which increases the risk of respiratory infections, including pneumonia, and close contact with sick people, as bacterial pneumonia can be transmitted from person to person. Children who live with siblings or attend crowded environments, such as daycare centers and schools, are more exposed to the risk of infection.

Underlying medical conditions, such as heart disease, lung disease, or immunodeficiencies, can also increase the risk of bacterial pneumonia in children. These conditions can compromise the immune system and make the body more susceptible to bacterial infections (RAPOSO et al., 2019).

MAIN SYMPTOMS OF BACTERIAL PNEUMONIA IN CHILDREN

According to Silva (2011), bacterial pneumonia in children can manifest itself through a series of symptoms that are important to recognize. Fever is one of the main signs to look out for, characterized by an elevation in body temperature above 38°C. It is, therefore, a response of the body to the infection caused by the bacteria that affect the lungs. A fever is usually a sign that the child's immune system is fighting off the infection.

In addition, the child may have a persistent cough, which can range from dry to productive with mucus sputum or even the presence of blood. Persistent coughing occurs due to inflammation of the lungs caused by the bacterial infection. The bacteria irritate the airways, leading to a cough reflex as a way to expel mucus and impurities from the lungs. Coughing can be constant, bothersome and hinder the child's sleep and well-being (SILVA, 2011).

Difficulty breathing is also a common symptom, with the child experiencing rapid, short, wheezing breathing. Chest pain may occur during breathing and also general weakness, fatigue, and lack of energy. Respiratory distress is a characteristic symptom of bacterial pneumonia in children and requires immediate attention. When infected, the lungs become inflamed and this affects the child's ability to breathe normally. Rapid, short, wheezing breathing is a clear sign that the respiratory system is overloaded (HATISUKA et al., 2015).

From the perspective of Assunção, Pereira and Abreu (2018), the child may present chest discomfort and pain during breathing, as the effort to breathe is greater due to inflammation and the presence of fluids in the lungs. This discomfort can be aggravated when the child performs physical activities or tries to lie down. The child may also show other signs of respiratory compromise, such as intercostal retractions (sinking of the areas between the ribs during inspiration), use of accessory breathing muscles (such as the neck muscles), and dilated nostrils during inspiration.

Other signs include loss of appetite, irritability, vomiting, and diarrhea. In more severe cases, cyanosis can occur, which is the bluish discoloration of the lips and skin due to a lack of proper oxygenation. The lack of oxygen in the tissues results in a decrease in blood oxygenation, leading to a change in the color of hemoglobin, which is responsible for transporting oxygen. Under normal conditions, hemoglobin is loaded with oxygen, giving the blood a reddish color. However, when there is a lack of oxygenation, hemoglobin becomes deoxygenated and acquires a bluer color (ASSUNÇÃO; PEREIRA; ABREU, 2018).

Cyanosis can be seen mainly on the lips and extremities, such as fingers and toes. In more severe cases, the bluish coloration may extend to other parts of the body. It is important to note that cyanosis is not an exclusive symptom of bacterial pneumonia, but it can be a sign that the child's respiratory function is compromised (ANDRADE et al., 2020).

MAIN TREATMENT OF BACTERIAL PNEUMONIA IN CHILDREN

Treatment of bacterial pneumonia in children involves specific approaches to fight the bacterial infection, relieve symptoms, and promote the child's full recovery. It is usually necessary to use antibiotics prescribed by the doctor to fight the bacteria responsible for the infection. Antibiotics are selected based on the causative agent of the pneumonia and sensitivity to the drugs. It is essential to correctly follow the prescribed therapeutic regimen, respecting the dosage and duration of treatment, even if symptoms improve before the end of antibiotics (HATISUKA et al., 2015).

In addition, it is important that the child rests and stays hydrated to help the body fight the infection. The intake of fluids, such as water, natural juices, and soups, is essential to maintain adequate hydration and help fluidize lung secretions. In some cases, when the child has difficulty breathing, low oxygenation, or low oxygen saturation, it may be necessary to administer supplemental oxygen to ensure adequate oxygenation and relieve respiratory distress (SILVA, 2011).

In addition to drug treatment, Raposo et al. (2019) emphasize that it is important to adopt general support and care measures, such as keeping the child at rest, ensuring a healthy and balanced diet, and avoiding exposure to factors that can aggravate symptoms, such as cigarette smoke or irritants. Medical follow-up is essential throughout the treatment of bacterial pneumonia in children. The doctor will carry out periodic evaluations to monitor the evolution of the infection, the response to treatment, and ensure the child's complete recovery.

It is important to note that self-medication and the indiscriminate use of antibiotics are contraindicated. Proper treatment of bacterial pneumonia in children requires medical evaluation and proper prescription of medications. Each case of bacterial pneumonia in children may have particularities, and treatment may vary according to the severity of the infection and the individual characteristics of the child. Therefore, it is essential to follow medical guidelines and maintain constant communication with the health professional responsible for the child's care (SILVA, 2011).

MAIN DIAGNOSES OF BACTERIAL PNEUMONIA IN CHILDREN

According to Nunes et al. (2019), the diagnosis of bacterial pneumonia in children is based on a thorough clinical evaluation and complementary tests. The doctor, when suspecting a bacterial infection in the lungs, will look for characteristic signs and symptoms and will perform a series of tests to confirm the diagnosis. During the clinical evaluation, the doctor will perform pulmonary

auscultation, listening carefully to the child's breathing sounds with a stethoscope. The presence of abnormal noises, such as crackling and crackles, may indicate a lung infection.

In addition, the doctor will evaluate the symptoms presented by the child, such as fever, persistent cough, difficulty breathing, cyanosis and other signs of respiratory compromise. A complete medical history will also be taken, taking into account risk factors, exposure to infectious agents, and vaccination history. To confirm the diagnosis of bacterial pneumonia, additional tests, such as chest X-rays, may be requested. X-rays may show the presence of opacities in the lungs, which are indicative of a bacterial infection (NUNES et al., 2019; GONÇALVES, 2012).

According to Silva (2011), other laboratory tests can also be performed, such as a complete blood count, which can reveal an increase in white blood cells, especially neutrophils, indicating an inflammatory response associated with bacterial infection. In some cases, it may be necessary to collect a sample of lung secretion for laboratory analysis, which can be done through tests such as sputum culture or bronchoalveolar lavage.

These tests can identify the bacterial agent causing the pneumonia and its sensitivity to antibiotics. It is important to emphasize that the diagnosis of bacterial pneumonia in children should be made by a qualified health professional, taking into account all clinical aspects and the results of complementary tests. An accurate diagnosis is essential for an adequate and effective treatment of lung infection (AMORIM et al., 2012; LEAL et al., 2017; MOREIRA, 2011).

FINAL THOUGHTS

Based on the accomplishment of this literature search, it was found that bacterial pneumonia in children is a lung infection caused by bacteria that can be serious if not treated properly. There are several risk factors associated with this condition, including age, lack of adequate immunization, unfavorable socioeconomic conditions, exposure to secondhand smoke, and close contact with sick people, as well as underlying medical conditions.

The diagnosis of bacterial pneumonia in children involves a thorough clinical evaluation, including pulmonary auscultation and analysis of the child's symptoms. Complementary tests, such as chest X-ray, complete blood count, and analysis of lung secretion samples, may be requested to confirm the diagnosis.

Treatment of bacterial pneumonia in children includes the use of antibiotics prescribed by the doctor, rest, adequate hydration, and supportive measures. It is essential to correctly follow the prescribed therapeutic regimen and maintain medical follow-up to ensure the child's complete recovery.

In this case, early diagnosis and appropriate treatment are essential for the effective management of bacterial pneumonia in children, aiming at improving symptoms, preventing complications, and promoting children's respiratory health.

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