PREDICTING THE OUTCOME OF THE DISEASE IN CHILDREN WITH ACUTE RESPIRATORY VIRAL INFECTIONS COMPLICATED BY PNEUMONIA

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Summary: Acute respiratory viral infections (ARVI) are a broad class of diseases caused by viruses that infect the upper and lower respiratory tracts. SARS is one of the most common causes of children going to pediatricians, and in some cases, the infection can be complicated by more serious conditions, such as pneumonia. Pneumonia, in turn, is one of the leading causes of hospitalization and mortality among children, especially in infancy and early childhood. Predicting the outcome of the disease in children with acute respiratory viral infections complicated by pneumonia is an important task that requires a comprehensive approach and consideration of many factors.

Key words: Pneumonia, ARVI, SARS.

1. Introduction

Acute respiratory viral infections are the most common infections in children, and pneumonia as a complication of these diseases is a serious threat to children's health. If left untreated or misdiagnosed, pneumonia can lead to serious consequences, including the need for artificial ventilation(AV), the development of respiratory failure, and even death. Predicting the outcome of the disease in children with acute respiratory viral infections complicated by pneumonia requires an assessment of the clinical picture, laboratory data, and the use of various scales and models to determine the severity of the condition.

2. Causes and mechanisms of pneumonia development on the background of acute respiratory viral infections

Pneumonia can develop as an independent disease or as a complication of acute respiratory viral infections, when a viral infection weakens the body's defenses and opens the way for bacterial infection. Most often, pneumonia develops against the background of the following viruses:

- **Respiratory syncytial virus (RSV)** is one of the main causes of pneumonia in young children.
- **Flu** — can cause both viral pneumonia and bacterial complications.
- **Parainfluenza, adenoviruses, and coronaviruses** can also lead to complications in the form of pneumonia.

The mechanism of development of pneumonia is that the virus affects the epithelium of the respiratory tract, which reduces local immunity, weakens the barrier functions of the body and creates favorable conditions for the penetration of bacteria into the lower respiratory system.

3. Predictive factors of disease outcome

Predicting the outcome of the disease in children with pneumonia on the background of acute respiratory viral infections is based on the analysis of various factors, such as the patient's age, the severity of the clinical picture, the presence of chronic diseases, as well as laboratory and instrumental data. The most important factors are:

3.1. Child's age

Young age is one of the main risk factors for developing severe complications of pneumonia. Children under 2 years of age, especially infants and newborns, are more likely to develop severe forms of pneumonia, as their immune system is not yet sufficiently developed, and their airways are narrower, which makes it difficult for normal air exchange.

3.2. State of the immune system

Children with weakened immune systems tend to have a higher chance of developing complications. An important factor is the presence of chronic diseases (for example, asthma, HIV infection, immunodeficiency conditions) that can worsen the prognosis.

3.3. Type of pathogen

The type of virus that causes SARS can also significantly affect the outcome of the disease. For example, pneumonia caused by influenza has a higher risk of developing severe complications than pneumonia caused by other viruses, such as rhinovirus.

3.4. Clinical manifestations of the disease

The severity of the clinical picture is important for predicting the outcome. Signs such as high fever, rapid breathing, shortness of breath, cyanosis, tachycardia, and severe changes in the X-ray of the lungs may indicate the development of a severe form of pneumonia.

3.5. Laboratory and instrumental data

- **Neutrophil-shifted leukocytosis** and elevated C-reactive protein (CRP) levels may indicate a bacterial complication.
- **Low blood oxygen levels (hypoxia)**, confirmed by pulse oximetry, are a serious prognostic factor.
- **X-ray data**: the presence of infiltrates in the lungs on the X-ray indicates inflammation, while the presence of bilateral pneumonia or large lesions may be a sign of a severe course of the disease.

4. Methods for predicting the outcome of the disease

To more accurately predict the outcome of pneumonia in children with acute respiratory viral infections, various scales and models are used, including clinical, laboratory, and radiographic data:

- **CURB-65 scale**: used to assess the severity of pneumonia, taking into account parameters such as the patient's consciousness, urination level, blood oxygen level, and other indicators.
- **PSI Scale (Pneumonia Severity Index)**: It takes into account age, comorbidities, symptoms, and radiography results to assess the severity of the disease.
- **RDS (Respiratory Distress Syndrome) scale**: uses an assessment of the severity of respiratory failure to predict mortality in pneumonia.

These scales help doctors more accurately predict the outcome of the disease and decide whether the child's condition requires hospitalization or outpatient treatment is sufficient.

5. Treatment and therapeutic approaches

Treatment of pneumonia in children should be comprehensive and include the following components:

- **Antibiotics**-for a bacterial complication of acute respiratory viral infections, broad-spectrum antibiotics are prescribed. In the case of viral pneumonia, antibiotics are not used, however, if a bacterial complication is suspected, a combination treatment may be prescribed.
- **Antiviral therapy**-Antiviral medications may be prescribed to treat viral infections (such as influenza).
- **Oxygen** therapy — for hypoxia, oxygen therapy is performed.
- **Pulse oximetry**-monitoring of blood oxygen saturation to assess the child's condition.
- **Physical therapy** — to improve expectoration and facilitate breathing.

6. Forecast

The prognosis of the disease in children with pneumonia on the background of acute respiratory viral infections depends on many factors, including the child's age, the severity of pneumonia, the speed of treatment initiation, and the presence of concomitant diseases. With timely diagnosis and proper treatment, the prognosis is usually favorable. However, if left untreated or if severe complications develop (such as sepsis or respiratory failure), an unfavorable outcome may occur, including a long recovery period or death.

Conclusion

Predicting the outcome of the disease in children with acute respiratory viral infections complicated by pneumonia is an important part of clinical practice. The use of various assessment methods, such as disease severity scales, laboratory tests, and radiographic data, helps doctors more accurately predict the outcome of the disease and make treatment decisions. It is important to remember that timely detection and adequate therapy can significantly reduce the risk of severe complications and improve the outcome of the disease in children.

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