

CLINICAL AND LABORATORY FEATURES OF RESPIRATORY SYNCYTIAL VIRAL INFECTION IN YOUNG CHILDREN

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Abstract.

Relevance. Respiratory syncytial infection is the most common cause of lower respiratory tract damage in children under 5 years of age. Respiratory syncytial virus infection is the most common cause of severe lower respiratory tract disease in children, with the development of bronchiolitis, obstructive bronchitis and pneumonia. The purpose was to study the clinical and laboratory characteristics of respiratory syncytial virus infection in young children. **Materials and methods of the study.** A general clinical examination, PCR of nasopharyngeal swabs for respiratory viruses, and bacteriological examination of throat and nasal swabs for pathogenic flora were carried out. 45 young children hospitalized in a hospital with laboratory confirmed MS infection. **Research results.** It was established that the disease occurs with a slightly pronounced intoxication-febrile syndrome against the background of moderate catarrhal symptoms. The severity is determined by respiratory failure due to the development of obstructive bronchitis, which is registered in 84.2% of cases, bronchiolitis, which is diagnosed in every third young patient, and, less commonly, pneumonia (15.8%). **Conclusion.** Children under one year of age are characterized by a severe course due to obstructive bronchitis, bronchiolitis or pneumonia with the development of severe respiratory failure.

Key words: Respiratory syncytial infection, clinical and laboratory features, respiratory failure, young children.

Introduction

Respiratory syncytial virus infection (RSVI) represents a major concern in pediatric healthcare, as it is the leading cause of severe lower respiratory tract infections among children. This virus is responsible for conditions such as bronchiolitis, obstructive bronchitis, and pneumonia. Globally, approximately 33.8 million new cases of RSVI are reported annually in children under five years old, with 3.4 million requiring hospitalization due to severe illness. The mortality rate remains significant, with an estimated 66,000 to 190,000 young children succumbing to RSV-related lower respiratory infections each year. These alarming statistics underscore the importance of further research into RSVI, the development of preventive measures, and the exploration of effective treatment options.

Although RSVI is present throughout the year, studies suggest seasonal variations in its incidence. While some researchers indicate a peak in spring, particularly in March and April, others report the highest occurrence in autumn, winter, and early spring. The onset and conclusion of the RSV season fluctuate annually. Several risk factors contribute to increased susceptibility in children, including male gender, cesarean delivery, preterm birth (≤ 32 – 34 weeks of gestation), low birth weight, neonatal hospitalizations, a history of respiratory disorders, prior exposure to antibiotics in premature infants, and insufficient maternal and infant serum vitamin D levels.

Clinical Presentation

The symptoms of RSVI vary depending on the child's age, viral strain (A or B), and the presence of co-infections with other pathogens. The illness typically begins with nasal congestion, coughing, mild fever, and reduced appetite. In many instances, RSVI leads to obstructive bronchitis, bronchiolitis, pneumonia, and breathing difficulties. Additional symptoms such as headaches, muscle pain, vomiting, and diarrhea may also occur.

Since RSVI presents with symptoms similar to other respiratory infections, including those

caused by rhinoviruses, coronaviruses, and parainfluenza viruses, laboratory testing is crucial for accurate diagnosis. Prompt confirmation of RSVI in young children helps minimize unnecessary antibiotic use, reduce hospitalization duration, and avoid excessive diagnostic tests and procedures.

Diagnostic Methods

Historically, viral culture was regarded as the «gold standard» for RSVI diagnosis. However, this method is costly, labor-intensive, and slow, requiring three to six days for detectable cytopathic effects. Advances in diagnostic techniques, such as centrifugation-enhanced cell cultures combined with direct immunoassays or monoclonal antibody-based detection, have improved sensitivity and reduced processing time to three days.

The enzyme-linked immunosorbent assay (ELISA) is widely used to detect RSV antigens, offering rapid and straightforward results. However, its effectiveness varies with age. In older children, its sensitivity is significantly lower (0–20%) due to reduced viral loads in respiratory secretions, whereas in younger children, sensitivity ranges from 72% to 94%, with specificity reaching 95% to 100%.

Polymerase chain reaction (PCR) testing is a more sensitive and specific alternative, delivering results within hours. Multiplex PCR techniques have further revealed that RSVI frequently occurs alongside co-infections with multiple respiratory viruses, emphasizing the complexity of diagnosing and managing the disease.

Study Objective

This study aims to assess the clinical and laboratory characteristics of RSVI in young children.

Materials and Methods

The research involved 45 hospitalized young children with laboratory-confirmed RSVI. Comprehensive clinical evaluations were conducted, including PCR testing of nasopharyngeal swabs for respiratory viruses and bacterial cultures from throat and nasal swabs to detect pathogenic flora.

Findings

Among the cases analyzed, 85.2% exhibited a moderate disease course, while 6.7% presented with severe RSVI. Disease severity was closely associated with bronchial obstruction and respiratory failure of grades 2–3. Two patients developed complicated pneumonia, necessitating mechanical ventilation. Nearly all patients (98.6%) had pre-existing health conditions, with common comorbidities including perinatal central nervous system damage (63.2%), rickets (84.5%), thymomegaly (25.2%), iron deficiency anemia (54.8%), and atopic dermatitis (46.3%).

Moderate intoxication symptoms were noted in 85.3% of children in the first group, whereas all children in the second group displayed these symptoms ($p < 0.01$). Fever exceeding 38°C was more frequent in children over one year of age (68.4% vs. 26.3%, $p < 0.05$). Lower respiratory tract involvement was identified in 77.8% of cases, with a significantly higher prevalence in the first group (91.4%) compared to the second group (52.6%) ($p < 0.01$).

Bronchial obstruction persisted longer in children under two years (8.43 ± 0.6 vs. 4.57 ± 0.96 days, $p < 0.05$). Respiratory failure was observed in 77.8% of first-group patients and 42.1% in the second group ($p > 0.05$). Laryngitis occurred in 28.5% of infants and 35.7% of older children ($p > 0.05$). Pneumonia was diagnosed in 24.5% of first-group children and 8.4% of second-group children ($p > 0.05$), with infants experiencing more severe cases.

Analysis of clinical symptoms showed that mild intoxication-fever syndrome, characterized by reduced appetite, lethargy, and irritability, occurred in 68.6% of cases. Fever above 38°C was recorded in 56.5% of children, while 78.5% had a low-grade fever lasting an average of 5 ± 0.56 days. Nearly half (45.8%) of the cases progressed without fever. Mild catarrhal symptoms, such as nasal discharge, were observed in 65.4% of cases, while purulent nasal discharge was present in 14% and nasal congestion in 87.7%, with symptoms lasting around five days.

Hematological findings during the acute phase revealed normocytosis in most cases, with moderate leukocytosis ($14.03 \pm 0.84 \times 10^9/\text{L}$) in 20% of children. The leukocyte differential count remained within age-appropriate limits. A moderate increase in erythrocyte sedimentation rate (ESR) was observed in 23% of cases.

Conclusion

RSVI continues to pose a considerable challenge in pediatric medicine. In infants, the infection

commonly presents with mild fever and moderate catarrhal symptoms. The severity of the disease is predominantly influenced by respiratory failure resulting from obstructive bronchitis (84.2%), bronchiolitis (observed in one-third of cases), and less frequently, pneumonia (15.8%). These findings emphasize the need for improved diagnostic strategies, timely medical interventions, and preventive measures to mitigate the burden of RSVI in young children.

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