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Fatal Outcome of Severe Communitiy-Acquired Pneumonia Complicated by Sepsis and Multiple Organ Failure in A Child with Chronic Inflammatory and Possible Autoimmune Background (Case Report and Literature Review)

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Abstract: Severe community-acquired pneumonia remains one of the leading causes of morbidity and mortality in children, particularly when complicated by sepsis, acute respiratory distress syndrome (ARDS), and multiple organ dysfunction syndrome. Children with chronic inflammatory conditions, anemia, malnutrition, and immune dysregulation represent a high-risk group for unfavorable outcomes.

This article presents a clinical case of a fatal outcome in an 8-year-old girl with severe pneumonia complicated by septic shock and multiple organ failure. The patient had a history of recurrent respiratory infections, chronic anemia, elevated inflammatory markers, high antistreptolysin O titers, and a positive antinuclear antibody test, suggesting a chronic inflammatory process with a possible autoimmune component. Despite intensive care management, including mechanical ventilation and vasoactive support, the disease progressed rapidly and resulted in death.

The case highlights the significance of early identification of risk factors, timely hospitalization, and comprehensive assessment of immune and inflammatory status in children with severe infections. Chronic systemic inflammation and immune dysregulation may contribute to rapid progression and poor outcomes of infectious diseases in pediatric patients.

Keywords: Children, severe pneumonia, sepsis, septic shock, multiple organ failure, chronic inflammation, autoimmune background.

Introduction: Despite the advances of modern pediatrics, severe community-acquired pneumonia remains one of the leading causes of childhood mortality, particularly in middle-income countries [1,2]. According to the World Health Organization, pneumonia accounts for more than 700,000 child deaths worldwide each year [3].

Cases complicated by sepsis, acute respiratory distress syndrome (ARDS), and multiple organ failure are of particular clinical importance, as mortality in such patients may exceed 30–50% [4,5]. The risk of an unfavorable outcome increases significantly in the presence of underlying conditions such as chronic anemia, protein-energy malnutrition, recurrent infections, and immunological disorders [6,7].

In recent years, increasing attention has been paid to the role of chronic systemic inflammation and autoimmune mechanisms in the development of severe infectious diseases in children [8,9].

Aim of the study: to analyze a clinical case of fatal outcome of severe pneumonia in a child with signs of chronic inflammatory and possible autoimmune processes, and to discuss the factors influencing the disease outcome in the context of current literature.

METHODS

The study was conducted as a retrospective clinical case analysis at the City Children's Clinical Hospital No. 4, Tashkent. Medical record No. 92-2026 (83) of the deceased patient was analyzed, including medical history, laboratory and instrumental findings, clinical course dynamics, and the scope and nature of intensive care therapy.

Additionally, a literature review of publications indexed in SCOPUS and PubMed over the past 10 years was performed, focusing on: severe pneumonia in children, pediatric sepsis, mortality risk factors, the role of anemia and immune/autoimmune disorders.

Case Presentation. An 8-year-old girl was admitted to the intensive care unit in an extremely critical condition with severe respiratory and cardiovascular failure.

Medical history revealed frequent episodes of acute respiratory infections and bronchitis, as well as episodes of generalized lymphadenopathy, fever, and arthralgia. She was the first child of the first pregnancy, with an unremarkable family history. The patient was born at term with a birth weight of 3.1 kg and was vaccinated according to the national immunization schedule.

Several months prior to hospitalization, laboratory findings showed signs of systemic inflammation: elevated ESR and C-reactive protein, moderate to severe anemia, thrombocytosis, high antistreptolysin-O (ASO) titer, positive antinuclear antibodies (ANA 1:160).

At admission, the patient's condition was assessed as critical: hypoxemia (SpO_2 up to 80%), tachycardia up to 158 bpm, severe intoxication and impaired consciousness.

Rapid progression of respiratory failure was observed, leading to the development of ARDS, septic shock, and multiple organ failure. Despite intensive therapy including mechanical ventilation, infusion therapy, broad-spectrum antibacterial treatment, and resuscitation measures, death occurred 13 hours and 20 minutes after hospital admission.

RESULTS

Analysis of this clinical case revealed a combination of several unfavorable prognostic factors:

Chronic systemic inflammation, confirmed by laboratory markers (CRP, ESR, ASO). Anemia and protein-energy malnutrition, reducing the compensatory capacity of the organism. Immunological disorders, including positive ANA, suggesting a possible autoimmune or post-infectious process. Late hospitalization, at the stage of already established septic condition.

DISCUSSION

According to the literature, chronic diseases and immune disorders significantly worsen the course of respiratory infections in children [10,15–17]. Anemia and nutritional deficiency are associated with an increased risk of sepsis and poor outcomes [11].

Elevated ASO levels indicate a previous streptococcal infection, which may act as a trigger for immune inflammation and cardiac complications [12]. Although nonspecific, positive ANA detected in the patient has been described as a potential factor associated with unfavorable infectious disease outcomes due to immune dysregulation [13].

Pediatric sepsis often presents with a subtle early clinical picture, leading to delayed diagnosis and initiation of intensive therapy [14]. In the present case, hospitalization occurred at the stage of advanced multiple organ dysfunction, significantly reducing the effectiveness of therapeutic interventions.

Thus, the fatal outcome should be considered the result of the combined effects of an infectious agent, systemic inflammatory response, and limited physiological reserve.

CONCLUSION

This clinical case demonstrates that severe community-acquired pneumonia in children, occurring against the background of chronic inflammatory and possible autoimmune processes, may have a fulminant and fatal course.

Early identification of risk factors, dynamic monitoring of children with chronic infectious-inflammatory conditions, and timely hospitalization are ключевые условия снижения летальности → key prerequisites for reducing mortality.

Further research is required to clarify the role of autoimmune mechanisms in the pathogenesis of severe infections in children.

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