

PNEUMONIA IN CHILDREN WITH COVID-19

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Abstract: *The causes of pneumonia that occurs during the Covid-19 disease and its complications in children. The purpose of the study: As everyone knows, this scientific work was carried out in order to better study the disease, the causative agent of Covid-19, SARS-CoV-2, which caused a worldwide pandemic in 2019-2022, and to choose the right treatment. The relevance of the scientific work is to determine whether pneumonia, which is common in children in autumn and winter, is related to Covid-19 and to compare the course of pneumonia in patients with Covid-19 with the course of pneumonia in patients who did not have Covid-19. Studying the complications of Covid-19 disease that remain in the lungs. The necessity of this scientific work is a better study of the Covid-19 disease, which has not yet been fully studied.*

Methods: *Analysis of articles and research on the topic. And In the Republic of Uzbekistan, a scientific study was conducted to evaluate the condition of children with Covid-19 disease. 100 children with pneumonia were divided into 3 groups: 1st group: pneumonia due to covid, 2nd group: post-hospital pneumonia, 3rd group: complications of various other diseases. Scientific research has studied the course of the process in them, considering it as a disease of pneumonia.*

Results: *Pneumonia in the disease of Covid-19 develops rapidly in sick children based on a specific system and quickly puts the patient in a critical condition. Scientific research analyzes the importance of in-depth study of pneumonia in children and early diagnosis and correct selection of treatment measures.*

Conclusion: *Pneumonia is a serious disease in children compared to adults. In the case of Covid-19, this risk increases even more and can end with the death of patients.*

Keywords: *COVID-19, children, pneumonia, SARS-CoV2, treatment*

INTRODUCTION

Pneumonia is a serious complication of COVID-19 in children, and it is one of the leading causes of hospitalization and mortality in pediatric patients with the disease. COVID-19 pneumonia in children can be caused by the SARS-CoV-2 virus, which primarily affects the respiratory system and can lead to inflammation and damage to the lungs.

Children with COVID-19 pneumonia may experience a range of symptoms, including cough, fever, difficulty breathing, fatigue, and chest pain. These symptoms can range from mild to severe, and some children may require hospitalization and intensive care.

The diagnosis of COVID-19 pneumonia in children is typically made through a combination of clinical evaluation, laboratory testing, and imaging studies. Chest X-rays and computed tomography (CT) scans can help to identify areas of lung inflammation and damage.

Treatment for COVID-19 pneumonia in children typically involves supportive care, such as oxygen therapy, fluid management, and pain relief. In some cases, antiviral medications may be used to target the SARS-CoV-2 virus, although the effectiveness of these medications in children is still being studied.

Prevention of COVID-19 pneumonia in children is critical, and it involves a combination of measures such as vaccination, social distancing, mask-wearing, and hand hygiene. Vaccination is currently recommended for children aged 12 and older, and it has been shown to be highly effective at preventing severe illness and hospitalization from COVID-19.

Overall, pneumonia is a serious complication of COVID-19 in children, and it requires prompt diagnosis and treatment to prevent severe illness and mortality. Vaccination and other preventive measures are key to reducing the risk of COVID-19 pneumonia in children and protecting their health and well-being.

METHODS

This review used PubMed and Science Direct to locate articles with at least an English abstract using the following keywords: [1] COVID-19 in children; [2] coronavirus in children; [3] COVID-19 pneumonia; [4] SARS-CoV-2 in children; [5] SARSCoV-2 pneumonia; and [6] COVID-19 imaging. The abstracts of articles were reviewed to determine whether the article was appropriate for the topic. We also reviewed the references contained within the selected articles, and read the full articles that were deemed relevant. Studying the course of the disease in children in the pneumonia department of the pediatric corps of the Tashkent Medical Academy (TMA).

Observations.

Causes of Pneumonia

Bacteria, viruses, or fungi can cause pneumonia.

Common causes include:

Flu viruses

Cold viruses

RSV virus (the top cause of pneumonia in babies age 1 or younger)

Bacteria called *Streptococcus pneumoniae* and *Mycoplasma pneumoniae*

Some people who are in the hospital get "ventilator-associated pneumonia" if they got the infection while using a ventilator, a machine that helps you breathe.

If you get pneumonia while you're in a hospital and aren't on a ventilator, that's called "hospital-acquired" pneumonia. But most people get "community-acquired pneumonia," which means they didn't get it in a hospital[7].

Today, we can include covid-19 among these reasons.

PATHOGENESIS OF LUNG DAMAGE

When SARS-CoV-2 enters the airways of a newly infected person, the viral S protein (spike protein) binds with high affinity to the angiotensin-converting enzyme 2 (ACE2) cellular transmembrane receptor found on the apical membranes of respiratory epithelial cells, mainly type II pneumocytes. Subsequently, the ACE2 receptor and SARS-CoV-2 are transported inside the cell and the S protein is cleaved by the protease TMPRSS2, inducing the release of the viral RNA within the cell and thereby allowing its replication. The ACE2 receptor is subsequently cleaved by a tumor necrosis factor alpha converting enzyme (TACE or ADAM17), a metalloprotease that allows the release of the ACE2 ectodomain (defined as soluble ACE2) into the extracellular space. Soluble ACE2 is enzymatically active and appears to be capable of binding with SARS-CoV-2. This led to speculation that administration of recombinant human ACE2 may reduce inflammation secondary to the action of SARS-CoV-2 [8].

The immune response induced by SARS-CoV-2 infection is characterized by two phases: an initial immunoprotective phase and an activation phase of the cytokine storm, which yields a more severe clinical manifestation. In the first phase, a robust adaptive response can control the virus and block inflammatory progression. If the immune system fails to control this phase, cell damage in organs with high concentrations of ACE2, especially pneumocytes, progresses by the release of cytokines and chemokines (IL-6, IL-10, and interferon) and the recruitment of inflammatory cells, which mediate lung damage and progression toward ARDS [9] Xu et al. found evidence of diffuse alveolar damage with desquamation of pneumocytes, hyaline membrane formation, and the presence of fibromyxoid cells with interstitial lymphocyte infiltration during histopathological examination of a patient who died of COVID-19 [10]. In fact, clinically speaking, SARS-CoV-2 causes interstitial pneumonia. One of the possible complications of this "exaggerated" inflammation is Pediatric Inflammatory Multisystem Syndrome (PIMS) or Multisystem Inflammatory Syndrome of Children (MIS-C) which occurs when inflammation becomes generalized. This would appear to be a post-immunological reaction caused by non-neutralizing IgG antibody and worsened by a cytokine storm that causes generalized inflammation that resembles an atypical Kawasaki's disease or a toxic shock syndrome [11].

CONCLUSION

This review summarizes the characteristics of COVID19 in pediatric populations, with a focus on pulmonary involvement. Despite the fact that the disease of covid-19 in sick children is milder than in adults, the pneumonia process is more intense than pneumonia caused by bacteria, and if the patient's immunity is weak, pneumonia can progress very

quickly and lead to death. Another surprising aspect is that the cases of recurrence and other respiratory diseases (bronchitis) were found in patients soon after the illness.

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