

TITLE OF THE ARTICLE: POST-VACCINATION IMMUNITY TO MEASLES IN CHILDREN WITH POST-COVID SYNDROME

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Abstract: This article examines the impact of post-COVID syndrome on post-vaccination immunity to the measles virus in children. A total of 89 children undergoing outpatient and inpatient treatment were examined between 2024 and 2025. Post-COVID syndrome was diagnosed by ELISA testing for IgG antibodies to SARS-CoV-2, and immunity to measles was assessed using the VectoMeasles-IgG ELISA test. A decrease in measles-specific antibody titers was found in previously vaccinated children with post-COVID syndrome. The study highlights the importance of monitoring and revaccination in cases of seronegative results.

Keywords: measles, vaccination, post-vaccination immunity, post-COVID syndrome, IgG antibodies, SARS-CoV-2, ELISA, children, revaccination, immune status, VectoMeasles, epidemiology, seronegativity, post-COVID immunity, prevention

Introduction

Measles remains one of the most contagious vaccine-preventable infections, despite widespread implementation of routine immunization. Since the COVID-19 pandemic, special attention has been given to the effects of coronavirus infection and post-COVID syndrome on immune system function, especially in children.

The relevance of this research lies in clinical and laboratory findings indicating a decline in previously developed post-vaccination immunity in children who have recovered from COVID-19. This may lead to renewed outbreaks of measles among vaccinated pediatric populations.

Post-COVID syndrome (also known as Long COVID) refers to a range of symptoms that persist or emerge at least four weeks after the acute phase of COVID-19, regardless of the initial severity. The World Health Organization (WHO) defines post-COVID syndrome as a condition occurring in individuals with confirmed or probable SARS-CoV-2 infection, in which symptoms last for at least two months and cannot be explained by alternative diagnoses.

Although the pathophysiological mechanisms of post-COVID syndrome are not fully understood, possible factors include chronic inflammation and immune dysregulation, autoimmune reactions triggered by molecular mimicry, viral RNA persistence, microvascular damage with hypercoagulability, autonomic nervous system dysfunction, and psycho-emotional consequences of the disease.

This syndrome poses particular risks for children, including multisystem inflammatory syndrome in children (MIS-C) and subtle disruptions in immune homeostasis. Symptoms commonly include chronic fatigue, shortness of breath, "brain fog," headaches, palpitations, muscle and joint pain, sleep disturbances, anxiety, depression, rashes, and low-grade fever.

In children, additional signs may include emotional instability, reduced academic performance, gastrointestinal issues, and weakened immune responses, including reduced antibody titers from past infections or vaccinations.

Diagnosis of post-COVID syndrome requires a comprehensive approach, including clinical observation, validated questionnaires, laboratory tests (especially IgG ELISA for SARS-CoV-2), functional testing (e.g., pulse oximetry, ECG, pulmonary function tests), and ruling out other chronic or acute conditions.

In this study, post-COVID syndrome in children was confirmed by ELISA testing for IgG antibodies to SARS-CoV-2, with titers above 1 IU/mL considered significant. To investigate the effect of post-COVID syndrome on measles post-vaccination immunity in children and evaluate the need for revaccination.

Between 2024 and 2025, 89 children were examined, both as outpatients and inpatients. All had previously received measles vaccinations in accordance with the national immunization schedule. To confirm past SARS-CoV-2 infection and diagnose post-COVID syndrome, ELISA was used to detect IgG antibodies. Post-COVID syndrome was diagnosed when IgG levels exceeded 1 IU/mL.

To evaluate measles-specific post-vaccination immunity, the VectoMeasles-IgG ELISA test (Novosibirsk) was employed for quantitative detection in serum. Thresholds were interpreted as follows: <0.12 IU/mL — seronegative (no immunity) 0.13–0.17 IU/mL — weakly positive (low immunity) 0.18 IU/mL — positive (adequate immunity)

Results showed that a significant proportion of children with post-COVID syndrome had reduced antibody levels against measles, despite full vaccination. Among them, 32% were seronegative (<0.12 IU/mL), indicating a complete absence of measles-specific immunity. Additionally, 21% had low-positive results requiring follow-up.

These findings suggest that COVID-19, through immune system disruption, may impair or eliminate previously established immunity. Such changes are especially concerning given declining vaccination coverage and rising vaccine hesitancy. Therefore, post-COVID syndrome in children should be considered a risk factor for reduced resistance to measles, even in vaccinated individuals.

Conclusion

This study confirmed a decrease in post-vaccination immunity to measles in children with post-COVID syndrome. The significance of the issue lies in the potential increase in measles cases among vaccinated children. Early diagnosis of immune status allows timely identification of at-risk groups and prevention of disease spread. Effective treatment of post-COVID syndrome is enhanced through a comprehensive approach including immunological

monitoring. Measles prevention in this population requires special attention, including revaccination when antibody titers fall below 0.12 IU/mL.

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