Letter to the Editor / *Editöre Mektup*

DOI: 10.5578/ced.20250409 • *J Pediatr Inf 2025;19(4):e278-e280*

Measles Infection in a Fully Vaccinated Adolescent Diagnosed with Complement C2 Deficiency

Komplement C2 Eksikliği Tanılı Tam Aşılı Bir Ergende Gelişen Kızamık Enfeksiyonu

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Cite this article as: Gözderesi Y, Akkoyun M, Bilici B, Orbay E, Önal P, Aygün D. Measles infection in a fully vaccinated adolescent diagnosed with complement C2 deficiency. J Pediatr Inf 2025;19(4):e278-e280.

Introduction

Measles is a highly contagious viral illness that typically affects children and presents with fever, cough, conjunctivitis, and a rash characterized by macules and papules. Although serious complications such as diarrhea, pneumonia, and subacute sclerosing panencephalitis can occur, measles is a vaccine-preventable disease (1). Despite eradication efforts, global vaccination programs were disrupted by the coronavirus disease-2019 pandemic, increased migration, and vaccine hesitancy, leading to decreased herd immunity and a resurgence of measles cases. In 2022 alone, over 9 million people were infected, with 136.000 deaths reported (2). According to World Health Organization data, Türkiye's measles first dose vaccination coverage has remained consistently around 95%, with second dose coverage approximately 94% in recent years and in 2023, approximately 8% of the measles cases reported worldwide were from our country (3,4).

Measles can have a more severe or atypical course in immunocompromised individuals. Herein, it was aimed to report a measles infection in a fully vaccinated adolescent with complement component 2 deficiency (C2D), who presented with classical symptoms such as fever, cough, and conjunctivitis, along with an unusual purpura-like rash, attributed to underlying thrombocytopenia. While C2D is mainly linked to bacterial infections, limited data suggest it may also impair viral defense. This case highlights a rare and possibly underrecognized vulnerability in such patients.

Case Report

A 16-year-old fully vaccinated boy with a history of familial thrombocytopenia, essential proteinuria, and C2D was admitted with a two-day history of fever, sore throat, fatigue, redness and itching in both eyes, myalgia, and cough. On the third day, he developed pruritic maculopapular rashes. His parents were first-degree cousins; some of his cousins also had familial thrombocytopenia. There was no family history of other immunodeficiencies, and the patient had no prior history of severe viral infections.

On physical examination, maculopapular rashes were observed on the lower extremities, palms, and soles (Figure 1,2). A large, purplish, purpura-like lesion was present in the upper gluteal region, without any history of trauma. He appeared ill and dehydrated. His temperature was 38.3 °C, oropharynx was hyperemic, tonsils were hypertrophic, and he had bilateral conjunctival discharge and pruritus. Bilateral crepitant

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Received: 31.03.2025 **Accepted:** 09.09.2025
Available Online Date: 25.12.2025

Figure 1. Maculopapular rashes on soles.

Figure 2. Maculopapular rashes on palms.

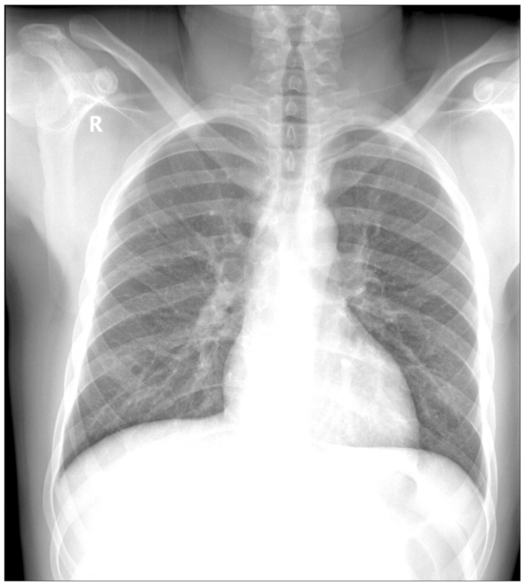

Figure 3. Bilateral parahilar peribronchial infiltrates were recorded in chest X-ray.

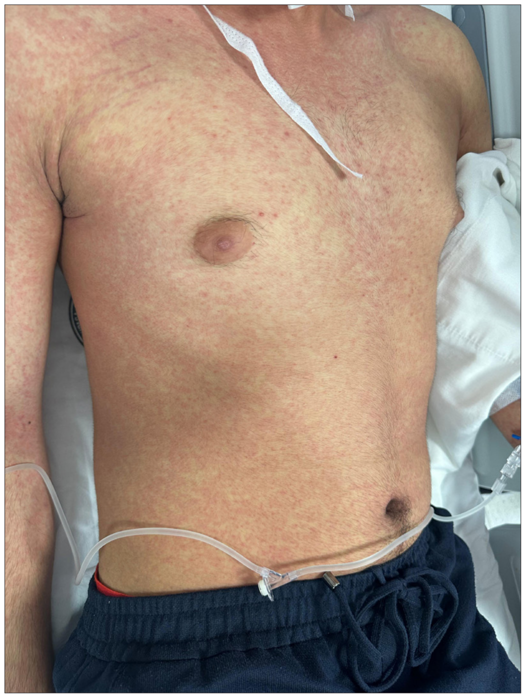

Figure 4. Maculopapular rash of measles over the trunk.

rales were heard in the lower lung zones, and breath sounds were slightly diminished in the right middle zone. Chest X-ray revealed bilateral parahilar peribronchial infiltrates (Figure 3).

On the second day of admission, a characteristic measles rash appeared on the face and trunk (Figure 4). The case was reported to the local Ministry of Health as a suspected measles infection. Laboratory tests showed isolated thrombocytopenia (21.000/μL) and mild neutrophilia (8.060/μL), with otherwise normal blood counts. Peripheral smear showed no atypical cells and was consistent with thrombocytopenia. Liver enzymes were slightly elevated, but electrolytes and renal function were within normal limits.

The patient was hospitalized with a presumptive diagnosis of measles and pneumonia. Serological testing for measles-specific IgM and IgG antibodies was performed; both results were negative. However, real-time polymerase chain reaction testing from a blood sample confirmed measles infection.

Vitamin A supplementation (200.000 IU/day for two days) was administered to prevent complications, and cefotaxime therapy was initiated. During follow-up, respiratory findings improved, general condition stabilized, and the rashes began to fade by the fourth day. He was discharged on the seventh day of hospitalization.

Discussion

Measles is one of the most contagious infectious diseases in the world. The R0 (the rate of infectivity) number of the virus is 12-18, which means that one index case might infect up to 18 unprotected people (5). Current national vaccination programs and vaccine coverage are essential for disease prevention. Measles requires a vaccination coverage of at least 95% to maintain herd immunity. Unvaccinated infected children act as reservoirs for the disease, and they cause the spread of MV among the immunocompromised children, and infection can develop even in fully vaccinated individuals.

As the most common complement deficiency, C2 deficiency can be asymptomatic or associated with autoimmune diseases such as systemic lupus erythematosus and recurrent infections with encapsulated bacteria (6). While C2 deficiency is mainly linked to bacterial infections, some experimental studies suggest that the complement system may also support antiviral defense, but clear clinical evidence is still lacking (7). However, there is no clear clinical evidence for a direct link between C2 deficiency and viral susceptibility (8). Our case could therefore be an incidental finding, but it emphasizes the need for further research into possible viral susceptibility in patients with complement deficiency.

Measles diagnosis can be challenging in patients with atypical presentations, especially among those with underlying immunodeficiencies. Our patient had purpura-like, blanching rashes in the gluteal area at first presentation more prominent than the classical maculopapular rash. Given the known diagnosis of hereditary thrombocytopenia, differential diagnoses initially included other viral exanthems or thrombocytopenic purpura. However, as the classic measles rash developed, alternative causes were ruled out.

Although the patient presented with clinical signs of pneumonia, chest X-ray findings were nonspecific, and no bacterial or viral coinfection was detected. His pneumonia was mild and responded quickly to supportive care and antibiotics. This aligns with previously reported mild-to-moderate respiratory involvement in measles cases among vaccinated or partially immune individuals.

Despite clinical signs, both measles IgM and IgG serologies were negative in our patient. The diagnosis was confirmed by real-time polymerase chain reaction. This discrepancy can be explained by early sample collection or delayed antibody response, especially in immunocompromised individuals. In patients with complement deficiencies, reduced or delayed humoral responses may lead to false-negative serologic results, emphasizing the need for molecular testing in such populations.

Conclusion

Measles is becoming an emerging public health concern all around the world, especially among under-vaccinated or unvaccinated children. Countries need to adopt effective and inclusive national vaccination programs for disease prevention. Suspicious and confirmed cases require an extensive surveillance program for both susceptible contacts and the long-term complications of the disease. The vaccination program must cover the key population groups, such as children in rural areas, migrant children, and children living in poor conditions. As Gavi says, measles is one of the deadliest and most contagious diseases, but it is also one of the most easily preventable.

References

1. *Paul Gastanaduy, Penina Haber, MPH; Paul A. Rota, PhD; and Manisha Patel, MD, MS. (2021). Epidemiology and Prevention of Vaccine-Preventable Diseases. The Pink Book, Available from: https://www.cdc.gov/pinkbook/hcp/table-of-contents/chapter-13-measles.html (Accessed date: 12.07.2024)*
2. *World Health Organisation. Fact sheet about measles. Erişim adresi: https://www.who.int/news-room/fact-sheets/detail/measles#:~:text=-Measles%20is%20one%20of%20the,for%20up%20to%20two%20hours (Accessed date: 12.07.2024).*
3. *World Health Organisation. Measles and rubella monthly update. Available from: https://cdn.who.int/media/docs/librariesprovider2/euro-health-topics/vaccines-and-immunization/eur_mr_monthly-_update_en_august-2024.pdf?sfvrsn=36799208_2&download=true (Accessed date: 11.07.2024).*
4. *World Health Organisation. Immunization dashboard current selection Türkiye. Available from: https://immunizationdata.who.int/dashboard/regions/european-region/TUR (Accessed date: 11.07.2024).*
5. *Guerra FM, Bolotin S, Lim G, Heffernan J, Deeks SL, et al. The basic reproduction number (R0) of measles: A systematic review. Lancet Infect Dis 2017;17(12):e420-8.*
6. *Mollah F, Tam S. Complement Deficiency. In: StatPearls. Treasure Island (FL): StatPearls Publishing; 2025. Available from: https://www.ncbi.nlm.nih.gov/books/NBK557581/ (Accessed date: 12.07.2024).*
7. *Ostrycharz E, Machul A, Dziadek J, Gamian A. New insights into the role of complement in regulation of viral infection. Biomolecules 2022;12(2):226.*
8. *MedlinePlus Genetics. Complement component 2 deficiency. Bethesda (MD): National Library of Medicine (US); 2024. Available from: https://medlineplus.gov/genetics/condition/complement-component-2-deficiency/ (Accessed date: 12.07.2024).*