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COVID-19 Reinfection in An Immunosuppressed Patient Without An Antibody Response



To the Editor:

Nearly all immune-competent individuals will develop an immune response with IgM and IgG antibodies within 2 to 3 weeks after SARS-CoV-2 infection. Antibody development in humans correlates with a marked decrease in viral load in the respiratory tract and improvement of symptoms with convalescent plasma suggest some level of protection by antibodies^{1,2,3}. Experimental infection in rhesus macaques induced humoral and cellular immune responses which resulted in protection from reinfection with SARS-CoV-2 challenge⁴. However, not all persons develop antibodies to SARS-CoV2 after infection.

On May 19, 2020, an 81-year-old woman with a history of rheumatoid arthritis (RA) treated with methotrexate and low-dose prednisone presented to an Arizona emergency department with altered mental status. A nasopharyngeal swab tested positive for SARS-CoV-2 (modified Centers for Disease Control and Prevention [CDC] assay). Chest x-ray showed no acute abnormalities. She remained on room air and was treated supportively. She was discharged on May 24 but then was admitted from June 5-10 for an unrelated illness. Nasopharyngeal swabs on June 6 and June 9 were negative for SARS-CoV-2 (modified CDC assay). Serum SARS-CoV-2 IgG (EuroImmuno) was negative. She was again admitted on July 20 with cough and shortness of breath with increasing oxygen requirement. Nasopharyngeal swab was positive for SARS-CoV-2 (Diasorin Simplexa). Chest x-ray demonstrated bilateral multifocal airspace opacities. She was treated with remdesivir for 5 days and dexamethasone for 10 days. Methotrexate was held. Maximum oxygen requirement was 15 L. In addition, she had delirium, a right deep venous thrombosis, and methicillin resistant Staphylococcus aureus pneumonia. By hospital day 21, oxygen requirement decreased to 4-6 L. Chest imaging continued to demonstrate multifocal infiltrate and airspace disease in the right upper lobe, both hilar regions, and the left lower lobe. She was discharged on August 20.

This case is notable for an initial confirmed SARS-CoV-2 infection with mild symptoms followed by two

negative PCR tests and a negative antibody, with development two months later of a more severe illness with confirmed SARS-CoV-2. It adds to the growing body of evidence^{5,6,7} that reinfection with SARS-CoV-2 is possible, especially in persons who fail to develop antibodies, and that the second infection may be more severe than the first. The use of immunosuppressive drugs (methotrexate, rituximab) may contribute to the lack of antibody response. Further study is needed to delineate the risks of reinfection with SARS-CoV-2 in patients who do not develop a detectable antibody.

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