

Reduced COVID-19 vaccine response in patient treated with dupilumab for IgG4-related disease



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Dupilumab is a novel anti-IL-4 receptor- α mAb that targets the signaling pathways of IL-4 and IL-13. Thus far, the data about adequate humoral immune response after vaccination against severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in patients who are taking dupilumab have been limited. (J Allergy Clin Immunol Global 2023;2:118-9.)

Key words: Dupilumab, IgG4, COVID-19, vaccination

Dupilumab is a novel anti-IL-4 receptor- α mAb that targets the signaling pathways of IL-4 and IL-13, which are key cytokines mediating the type 2 response. Studies on adults and children taking dupilumab during the pandemic revealed that these patients exhibited no significant increased risk of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) infection-related hospitalization and mortality, with some recent evidence reporting reduced symptom burden in these patients, supporting the idea that clinicians should continue administering dupilumab to patients with moderate-to-severe disease.¹⁻³ Although there is evidence suggesting that patients who have severe asthma or atopic dermatitis and are taking dupilumab and IL-5 blockers have lower antibody levels after SARS-CoV-2 mRNA vaccination than immunocompetent adults do, the data about adequate and durable humoral immune response after vaccination against SARS-CoV-2 in these patients are limited.⁴

CASE PRESENTATION

We previously reported the case of a 71-year-old man with IgG4-related disease whom we successfully treated with dupilumab.⁵ Informed consent was obtained from the patient to complete and publish this case report. The patient was followed over the past 3 years while his IgG4-related disease remained well controlled with dupilumab (dose, 300 mg subcutaneously every 2 weeks; total duration of therapy, 4 years), which he continued taking during the pandemic. In accordance with the vaccination guidelines and

Abbreviations used

COVID-19: Coronavirus disease 2019

SARS-CoV-2: Severe acute respiratory syndrome coronavirus 2

availability, he received 2 Pfizer SARS-CoV-2 mRNA vaccinations (on March 24, 2021, and June 18, 2021). On July 24, 2021 (36 days after the second vaccination), measurement of the patient's SARS-CoV-2 spike total antibody level was performed at Lifelabs using the Roche cobas Elecsys Anti-SARS-CoV-2 electrochemiluminescence immunoassay. The result was negative (<0.8 U/mL), suggesting the absence of a prior infection or vaccination history. As such, a third dose was administered on November 10, 2021. To optimize the patient's potential immune response, dupilumab was held for 1 month before his third dose and was reinitiated 2 weeks after vaccination. On December 3, 2021 (23 days after vaccination), the same technique and laboratory were used to repeat measurement of the patient's SARS-CoV-2 spike total antibody; the result was 2282 U/mL (a level of ≥ 0.8 U/mL is considered a positive result). The result of measurement of the patient's SARS-CoV-2 nucleocapsid total antibody level was negative, implying immune response through vaccination and not through infection by the SARS-CoV-2 virus.

DISCUSSION

To our knowledge, this is the first case report on a patient with IgG4-related disease controlled with dupilumab who was found to have adequate vaccine titers only after his dupilumab had been held for 1 month after he failed to mount an antibody response to the first 2 vaccination doses while undergoing therapy. Dupilumab blocks both IL-4 and IL-13 signaling. IL-4 and IL-13 are the key players mediating the type 2 response, and both are implicated in B-cell isotype class switching to generate IgE. We hypothesize that the results presented in this case report are due to the presence of the threshold effect in these T_H2 cytokines. As the indications for dupilumab use continue to expand, an increasing number of patients are relying on this biologic for control of their disease. Given the strong evidence that lower vaccine-specific titers afford less protection against coronavirus disease 2019 (COVID-19) and acknowledging that holding dupilumab may not be feasible in all cases, this report highlights the approach described as 1 possible strategy for protecting these individuals, who may unknowingly remain at high risk for severe disease.

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