SARS-CoV-2 Vaccine Immunogenicity in Patients with Autoimmune Inflammatory Rheumatic Diseases

An Expert Interview with Victoria Furer

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While the efficacy of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) vaccine in preventing serious disease is well documented, studies are now emerging in immunosuppressed individuals. Among these are studies on the vaccination response in individuals with autoimmune inflammatory rheumatic diseases who take immunosuppressant therapies.

In this expert interview, Dr Victoria Furer from the Tel Aviv Sourasky Medical Center, Tel Aviv, Israel, discusses the findings of her recent study, which were presented at the European Congress of Rheumatology (EULAR 2022), 1–4 June 2022.[1]

Q. What is known about the immune response to SARS-CoV-2 vaccination in patients with autoimmune inflammatory rheumatic diseases, and what questions remain unanswered?

The decline in anti-spike antibody levels after two doses of the BNT162b2 mRNA (Pfizer, New York, NY, USA) vaccine has been confirmed in the general population in several studies.[2,3] However, there is a need for further studies on immunosuppressed individuals, including those with rheumatic disease.

Q. What were the aims and design of your study?

The primary aim of our study was to investigate the kinetics of the immune response to the BNT162b2 mRNA vaccine after the second and third vaccine doses in adult patients with autoimmune inflammatory rheumatic diseases compared with an immunocompetent population. The follow-up was up to 6 months after the second dose and 2–6 weeks after the third dose. The secondary aims were to evaluate the effect of immunosuppressive treatment on vaccine immunogenicity and the efficacy of the vaccination. This was a multicentre (three centres), longitudinal study that was launched at the time of the approval of coronavirus disease 2019 vaccinations in Israel. We enrolled 729 patients with rheumatic diseases and 122 immunocompetent control participants who were willing to undergo vaccination and follow-up.

Q. What were the findings in terms of humoral response?

At 6 weeks after the second vaccine dose, there was a full antibody response in immunocompetent participants and an adequate response (86%) in patients with rheumatic diseases. Among the 682 patients with rheumatic diseases and 116 control participants who completed the 6-month follow-up, there was a waning of antibody response in both groups. There were detectable levels of antibodies in 96% of the immunocompetent participants compared with 74% of the patients

with rheumatic diseases. Among the participants vaccinated with the booster dose, the seropositivity rate increased to 82% following the third vaccine dose compared with 100% among the controls.

Q. What was the impact of the therapies on the vaccine's immunogenicity?

Most anti-cytokine therapies do not prevent the antibody response to the vaccination. The use of rituximab was the main risk factor for the lack of response to the vaccine. However, among patients treated with rituximab, one-third of patients who were seronegative prior to the booster vaccination had a response to the vaccine. Other factors associated with a lower vaccine response include treatment with glucocorticoids, mycophenolate motil (CellCept®; Genentech, South San Francisco, CA, USA) and abatercept. All patients treated with mycophenolate motil and abatercept responded to the booster vaccine. In a group of patients who were treated with rituximab, we also evaluated cellular immune response prior to and after the booster dose, and the cellular response was preserved in patients who did not develop any antibody response. This finding has been confirmed in several other studies.[4,5]

Q. On the basis of these findings, what are your recommendations for patients with autoimmune inflammatory rheumatic diseases?

It is important to emphasize that our study took place in October 2021, which was before the surge of the Omicron variant in Israel; therefore, the data cannot be applied to the Omicron cases. Our study supports the current recommendations by both the European Alliance of Associations for Rheumatology and the American College of Rheumatology, which support the use of booster vaccination in individuals susceptible to infection. Although unrelated to our study, we recommend the use of passive vaccination in patients treated with rituximab or in other heavily immunosuppressed individuals. ❑

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