Correspondence

Immune response to COVID-19 mRNA vaccination in patients with psoriasis undergoing treatment with biologics

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Dear Editor,

Several strategies have been adopted to fight against COVID-19.[1] Among these, vaccination is the main weapon to overcome the pandemic.[2] Currently, two viral vector-based vaccines Ad26.COV2.S (Johnson & Johnson) and AZD1222 (AstraZeneca) and two mRNA vaccines [mRNA-1273 (Moderna) BNT162b2 (Pfizer/BioNTech)] have been authorized by the Italian Medicines Agency.[2] The possible impaired efficacy of vaccines in patients with psoriasis under immunosuppressive/immunomodulant treatment is being widely debated. In this context, we read with great interest the article recently published in *Clinical and Experimental Dermatology* by Marovt *et al.*,[3] which showed that antibody response against COVID-19 following two doses of BNT162b2 vaccine in patients with psoriasis undergoing biologic treatment did not differ significantly from that of healthy controls in terms of seroconversion. We conducted a similar prospective study at the Dermatology Centre of the University of Naples Federico II.

Blood samples were collected from patients at approximately 4 weeks (range 3–6 weeks) following the second dose of COVID-19 vaccination. Only mRNA vaccines were considered; patients receiving viral vector-based vaccination or with a history of COVID-19 infection were excluded.

IgG antibodies to COVID-19 protein spike were detected using an indirect chemiluminescence immunoassay, considering a titre of < 50 binding antibody units (BAU)/mL to be a negative result. Demographic and clinical variables were analysed through descriptive statistics. Student *t*-test and χ^2 test were used to assess the statistical significance of the differences for quantitative and qualitative characteristics. $P < 0.05$ was considered statistically significant.

In total, 44 patients with psoriasis under biologics [21 female (47.7%), 23 male (52.3%); mean ± SD age 51.2 ± 11.2 years, disease duration 18.7 ± 14.2 years, therapy duration 32.9 ± 7.3 months] were enrolled (Table 1). Of the 44 patients, 19 (43.2%) were treated with anti-tumour necrosis factor-α, 2 (4.5%) with ustekinumab, 18 (40.9%) with anti-interleukin (IL)-17 and 5 (11.4%) with anti-IL-23. The healthy control (HC) group consisted of 57 people [32 female (56.1%), 25 male (43.9%); mean age 40.8 ± 14.29 years].

Table 1 Clinical features and comparison between patients with psoriasis and control groups.

Parameter	Patients	Controls	*P*
Patients, *n*	44	57	
Age, years; mean ± SD	51.2 ± 11.2	40.8 ± 14.2	0.001
Female sex, *n* (%)	21 (47.7)	32 (56.1)	NS
Disease duration, years	18.7 ± 14.2	NA	NA
Therapy duration, months	32.9 ± 7.3	NA	NA
Psoriatic arthritis	12 (27.3)	NA	NA
Type of vaccine			
mRNA BNT162b2	41 (93.2)	52 (91.2)	NS
mRNA-1273	3 (6.8)	5 (8.7)	NS
Number of responders	43 (97.7)	56 (98.2)	NS
Antibody titre, BAU/mL			
All patients	468.4 ± 420.3	586.5 ± 408.3	NS
< 55 years[a]	497.5 ± 437.0	575.42 ± 366.90	NS
> 55 years[b]	426.3 ± 403.5	620.64 ± 530.53	NS
Medication			
Anti-TNFα (19 of 44; 43.2%)	517.4 ± 455.7	NA	NA
Anti-IL-12/23 (2 of 44; 4.5%)	364.5 ± 372.6	NA	NA
Anti-IL-17 (8 of 44; 40.9%)	483.5 ± 424.3	NA	NA
Anti-IL-23 (5 of 44; 11.4%)	269.0 ± 311.7	NA	NA

BAU, binding antibody unit; IL, interleukin; mRNA-1273, Moderna mRNA-1273; mRNABNT162b2, Pfizer mRNABNT162b2; NA, not applicable; NS, not significant; TNF, tumour necrosis factor. [a]26 of 44 patients in the psoriasis group vs. 43 of 57 patients in the control group. [b]18 of 44 patients in the psoriasis group vs. 14 of 57 patients in the control group.

The BNT162b2 and mRNA-1273 vaccines were respectively given to 41 (93.2%) and 3 (6.8%) patients with psoriasis, and to 52 (91.2%) and 5 (8.7%) controls. A positive antibody response was detected in 43 (97.7%) patients and 56 (98.2%) HCs, with no significant difference between the groups. Despite mean antibody titres being slightly higher in the HC than in the psoriasis cohort (586.5 ± 408.3 BAU/mL vs. 468.4 ± 420.3 BAU/mL), we found no statistically significant differences

between the study groups, in contrast to the results of Marovt *et al.*[3] In line with that report,[3] we also did not observe significant differences in antibody titres between patients > 55 years (426.3 ± 403.5 BAU/mL) and those aged < 55 years (497.5 ± 437.0 BAU/mL) in the psoriasis group. In addition, there were no significant differences between the psoriasis and HC cohorts. Finally, no statistically significant differences in antibody titres were found between the different treatment groups.

Vaccination is the main strategy to overcome the COVID-19 pandemic. Several concerns about both the risk and the effectiveness of COVID-19 vaccination in patients with psoriasis have been raised.[4] Our experience confirms the results of Marovt *et al.*, showing no differences in rate of seroconversion between HCs and biologic-treated patients with psoriasis. Moreover, even though we observed a trend towards a slightly higher mean antibody titre in HCs compared with patients, this was not statistically significant, suggesting that biologic treatment did not affect the effectiveness of vaccination. Compared with the study of Marovt *et al.*,[3] our cohort was larger, patients and controls were also compared for age, and the mRNA-1273 vaccine was considered. The main limitations of our study were the small numbers of patients and HCs, and no testing for cell-mediated immunity.

COVID-19 has revolutionized the management of patients with psoriasis (e.g. through teledermatology), including those undergoing treatment with biologics.[5] Several concerns on the safety of biologic treatment have been raised and several strategies have been adopted to increase compliance with treatment and reduce vaccine hesitancy among these patients.[6,7] Currently, data on the immune response to COVID-19 vaccination in patients with psoriasis receiving biologics are scant and often conflicting.[3,4]

Clinicians must keep in mind the safety and effectiveness of COVID-19 vaccination in patients undergoing biologic treatment, and also consider the risk of psoriasis worsening following the vaccine.[8] Being on biologics for psoriasis does not seem to reduce the immune response of vaccination and a booster dose is advisable to increase vaccination efficacy. Further studies are needed to better understand the relationship between immune response and biologic treatment.

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