Humoral response to mRNA-based COVID19 vaccine in patients with autoimmune rheumatic disease: retrospective comparative study

Background: The effectiveness of anti-SARS-CoV-2 vaccines for patients with autoimmune rheumatic diseases (ARDs) treated with immunomodulators remain uncertain.

Objective: to evaluate whether the humoral immune response to anti-SARS-CoV-2 mRNA-based vaccines differs between patients without and with ARDs under treatment with immunomodulators.

Method: We retrospectively reviewed the electronic medical records of patients with ARDs and control patients without autoimmune inflammatory diseases. All patients were SARS-CoV-2 infection-naïve, had completed COVID19 vaccination, and had been serologically tested using Elecsys® anti-SARS-CoV-2 S immunoassays. Samples were considered non-reactive and poorly reactive when titers were <0.8 and <132 binding antibody units/mL, respectively.

Result: Mean (SD) ages of 110 patients with ARDs and 20 controls were 47.1 (12) vs. 59.3 (8.9) years, and women predominated in both groups (60% vs. 75%, P = 0.203). The most frequently prescribed DMARDs was methotrexate (MTX) in 50 (45.5%) patients, followed by TNF-i in 46 (41.8%), rituximab in 20 (18.2%), hydroxychloroquine in 20 (18.2%), JAK-i in 12 (10.9%), and lL6-i in 7 (6.4%) patients. The mean (SD) anti-SARS-CoV-2 S antibody titer of only the rituximab subgroup significantly differed from the control (P = 0.012).

Table 1. Comparison of immune responses to mRNA-based anti-SARS-CoV-2 vaccines between ARD patients treated with immunomodulators and controls

	Control N = 20	Cs-DMARDs N = 26	MTXM N = 15	TNF-i N = 46	Rituximab N = 20	JAK-i N = 12	IL6-i N= 7
Mean (SD), anti-SARS Cov2 S IgG, p	226.8 (57.5) Ref	238.7 (34.3) 0.389	230.5 (44) 0.841	211.5 (80) 0.443	147.5 (120) 0.012	208.7 (76.2) 0.449	217.1 (86.8) 0.740
Seropositive, (%) p	(100) Ref	(100) NA	(100) NA	(100) NA	(65) 0.004	(100) NA	(100) NA
*Poor reactive, (%) p	(10) Ref	(3.8) 0.572	(6.7) 1.000	(19.6) 0.338	(40) 0.028	(25) 0.338	(14.3) 1.000

MTXM, methotrexate monotherapy; Cs-DMARDS, combinations of conventional synthetic disease modifying antirheumatic drugs (MTX, leflunomide, sulfasalazine and hydroxychloroquine); *< 132 BAU/mL.

Conclusion:

Cs-DMARDs, TNF-i, JAK-i, and IL6-i were associated with comparable seroconversion rates to anti-SARS-CoV-2 mRNA-based vaccines, whereas rituximab was significantly associated with decreased immunogenicity.