Background: The CHAdOx1, CoronaVac, BNT162B2 and Janssen vaccines are available for the primary and booster immunization of immunosuppressed patients. However, there are few studies in the literature that assess the immunogenicity and safety of the different platforms COVID-19 vaccines in patients with autoimmune diseases (AID).

Objectives: The present study aims to evaluate the immunogenicity through anti-spike IgG antibodies 28 days after the booster dose in the heterogeneous boost groups compared with homologous regimen of the vaccine against COVID-19 in patients with AID.

Methods: This study is done in SAFER study: “Safety and efficacy on COVID-19 Vaccine in Rheumatic Disease”, a multicentric prospective phase IV study, in real life, in Brazil, started on May 2021. Data from this analysis were from 8 centers, from all Brazilian areas, after 2 or 3 doses of vaccine against COVID-19 in patients with AID age ≥ 18 years. Exclusion criteria were pregnancy, previous severe adverse events (AE) to any vaccine or other immunosuppression causes. Demographics, diagnoses and therapeutic regimens were collected via participant report through the Research Electronic Data Capture tool. Available vaccines were adenos viral vector vaccine (CHAdOx1, Astrazeneca and Ad26.COV2-S, Janssen), mRNA vaccine (BNT162B2, Pfizer-BionTech) or inactivated SARS-COV-2 vaccine (Coronavac). Participants were followed up by means of blood collection for measurement of IgG antibody against SARS-COV-2 spike receptor-binding domain by chemiluminescence (SARS-COV-2-Igg-II Quant assay, Abbott-Laboratories) at baseline and 28 days after the first, 2nd and 3rd doses. The seropositivity was defined for titers IgG-Spike ≥ 7.1 BAU/mL. The ANOVA, the post-hoc Tukey and pairwise comparisons tests were used to compare the IgG-S titles between the groups. An alpha level of 5% significance was used in all analyses.

Results: A total of 1096 participants were included and followed from the first dose. 709 patients AID received the complete 3-dose regimen: systemic lupus erythematosus (N=238, 33.6%), rheumatoid arthritis (N=143, 20.2%), spondyloarthritis (N=96, 13.5%), primary Sjogren’s syndrome (N=56, 79.), inflammatory bowel disease (N=50, 7.1%), vasculitis (N=31, 4.4%), systemic sclerosis (N=25, 3.5%), Behçet syndrome (N= 19, 2.7%) myositis (N= 12, 1.7%), other systemic AID (N= 39, 5.5%). Mean age was 41.59 (12.2), female N=556, (78.4%) and admixed race (N=370, 52.2%). Primary immunization was performed with Coronavac in 265 (37.4%), CHAdOx1 in 403 (56.8%) and Pfizer in 41 (5.8%) AID patients. After the 2nd dose (28 days), the booster was performed with Coronavac (N=10, 1.4%), CHAdOx1 (N=226, 31.9%), Pfizer (N=464, 65.4%) and Janssen (N=9, 1.3%). Anti-spike IgG antibodies were analyzed in the 657 patients who received the three doses. All patients had a substantial increase in IgG antibody concentrations 28d after the booster vaccine with median 275.9 BAU/ml (88.8 - 1000.9) vs. 1217.0 (402.3 - 3213.7) booster vaccine. All heterologous regimens (N=515) had anti-spike IgG responses at day 28 that were superior to homologous booster (N=194) with median titers antibodies, which could improve protection against COVID-19 in AID patients.

Conclusion: All vaccines administered as third dose induced an increase in IgG-S titers antibodies, which could improve protection against COVID-19 in AID patients. Heterologous booster vaccination produced greater humoral immune responses than homologous booster, which is relevant in this immunosuppressed population.


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