Background: There is still controversy about the efficacy of COVID-19 vaccination and its extent in lowering immunogenicity of Rheumatoid Arthritis (RA) patients. The guideline in whether immunosuppressive agents need to be discontinued before the vaccination is continuously updated because it is considered to lower immunogenicity. Furthermore, there is great discussion on the effectiveness of the COVID-19 booster vaccine and interest in antibody generation in different types of vaccine, as in South Korea there are many patients who were prescribed the mRNA booster vaccine after two doses of ChAdOx1-S nCoV-19 vaccine.

Objectives: Thus, we investigated the differences of antibody production between patients who received only two doses of ChAdOx1-S nCoV-19 and those who received the mRNA booster vaccine. Also, antibody production under different types of immunosuppressive agents was analyzed.

Methods: From October 14, 2021 to January 21, 2022 at a tertiary referral center, two patient groups diagnosed with RA were studied prospectively; one group that completed 1st and 2nd doses of ChAdOx1-S nCoV-19 vaccine, second group that completed mRNA booster vaccine as well as two doses of ChAdOx1-S nCoV-19 vaccine. SARS-CoV-2 antibody testing on the semiquantitative anti-SARS-CoV-2 S enzyme immunoassay was done, and differences in antibody titers were analyzed in patients who received different immunosuppressive agents such as csDMARD, TNF inhibitor, JAK inhibitor, Tocilizumab, Abatacept and Corticosteroid. Statistical analysis with a multivariate logistic regression model was performed.

Results: In a total of 261 patients, 153 patients had completed two doses of ChAdOx1-S nCoV-19, 108 patients had completed third mRNA booster vaccine. Anti-SARS-CoV-2 RBD antibody positive rate (titer>0.8U/mL) was 97%(149/153) and 99%(107/108) respectively, and only 5 patients showed negative result. In the aspect of high antibody titer(>250U/mL), which is the upper limit of the RBD antibody immunoassay, the result showed rate of 31% (47/153) in the non-booster group and 94%(102/108) in the booster group respectively.

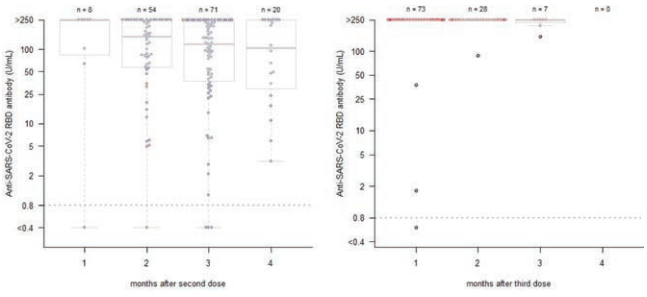

Figure 1. Anti-SARS-CoV RBD antibody titer of two groups

Among the different immunosuppressive agents and other clinical aspects, multivariate analysis revealed that corticosteroid use (OR 0.91; 95% CI: 0.86-0.98), older age(OR 4.33; 95% CI: 1.34-13.91), and male gender(OR 0.35; 95% CI 0.16-0.75) were significantly associated with low rate of high antibody titer. Furthermore, out of 14 patients who underwent antibody test twice before and after the mRNA booster vaccine, other than four patients who already showed high titer of >250U/mL before the mRNA booster vaccine, 10 patients showed an increase in titer after the booster vaccine and 7 patients were acquired high titer of >250U/mL.

Conclusion: Anti-SARS-CoV-2 RBD antibody positive rate was 97% or more regardless of the mRNA booster vaccination. However, patients who received the mRNA booster vaccine after two doses of ChAdOx1-S nCoV-19 vaccine showed high antibody titer (>250U/mL) three times more than those who did not receive the booster shot. Our findings also showed that corticosteroid use, old age, and male gender is significantly associated with low rate of acquiring high antibody titer.

Disclosure of Interests: None declared

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POS1248 URIC ACID AND COVID-19: PATTERN OF CHANGES AND ASSOCIATION WITH PROGNOSIS

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Background: Coronavirus disease causes a proximal tubule dysfunction of kidneys, inducing uric acid loss [1]. It has been established that several changes in laboratory markers (C-reactive protein (CRP), ferritin, interleukin-6 (IL-6)) can predict the severity of Covid-19 [2]. The purpose of this retrospective study was to analyze whether uric acid could act as another predictor of severe Covid-19.

Objectives: To evaluate the relationship between the severity of Covid-19 and uric acid levels on admission to the hospital.

Methods: This retrospective study included 150 hospitalized patients with confirmed Covid-19 (mean age 60.3±14.6 years; 52% were men), the severity of which was determined by the presence and type of oxygen support: (1) without O2, (2) O2 by mask or nasal cannula, (3) continuous positive airway pressure, (4) positive bi-pressure in the airways or high-flow oxygen, (5) invasive ventilation. Among them, 90 subjects required oxygen support, and 60 people didn't. The mortality rate in our study was 9.3%. The average uric acid level was compared with patients without Covid-19 (40 subjects). The study included patients who didn't receive urate-lowering therapy. Levels of CRP, ferritin, IL-6, D-dimer were also determined on admission. The Spearman's rank coefficient was used for measuring correlation.

Results: The mean uric acid level in patients with coronavirus disease was 251.5±104.1 μmol/L; without Covid-19 it was significantly higher — 328.6±96.9 μmol/L (p<0.001). Approximately one in four (24.6%) Covid-19 patients had uric

Table 1. Analysis of immunosuppressive agents and other clinical aspects for high antibody titer(>250U/mL) after two doses of ChAdOx1-S nCoV-19

	Univariate analysis			Multivariate analysis		
Parameter	OR	95% CI	p value	OR	95% CI	p value
Clinical features						
Age	0.917	0.860-0.978	0.008	0.917	0.857-0.981	0.012
Sex	3.674	1.206-11.191	0.022	4.330	1.348-13.912	0.014
DAS 28	1.144	0.670-1.950	0.622			
Duration	0.930	0.830-1.043	0.214			
Medications						
csDMARD	1.273	0.639-2.533	1.273			
TNF inhibitor	2.211	0.795-6.145	0.128			
JAK inhibitor	0.665	0.275-1.607	0.365			
Abatacept	0.368	0.038-3.602	0.391			
Tocilizumab	1.264	0.438-3.648	0.665			
Corticosteroid	0.472	0.235-0.949	0.035	0.349	0.163-0.748	0.007
Medication dose						
Methotrexate	0.993	0.919-1.072	0.855			
Corticosteroid	0.849	0.719-1.003	0.054			

acid levels below the lower limit of normal (208 μmol/L for men, 155 μmol/L for women). A decrease in serum uric acid levels was also observed in patients suffering from asymptomatic hyperuricemia or gout. However, there was no correlation between uric acid levels and disease severity (r=0.01, p=0.88). Also, uric acid levels did not correlate with other laboratory markers of severe Covid-19 (CRP: r=0.07, p=0.73; ferritin: r=0.15, p=0,07; IL-6: r=0.11, p=0,22; D-dimer: r=0.02, p=0,79).

Conclusion: Low uric acid levels are common in patients with Covid-19, but are not predictive of a more severe course of this disease. A correlation between uric acid and the level of other laboratory markers of severe Covid-19 was not found.

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POS1249 EFFICACY AND SAFETY OF CHADOX1 NCOV-19/AZD1222 AND MRNA-1273 VACCINES: A COMPARATIVE STUDY IN PATIENTS WITH AUTOIMMUNE RHEUMATIC DISEASES

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Background: Several studies have demonstrated immunogenicity after COVID-19 vaccination in patients with autoimmune rheumatic diseases (AIRD) [1], but the differences between mRNA-based and vector vaccines and the cellular responses to COVID-19 vaccines according to distinct immunogenicity in AIRD patients are still unclear.

Objectives: To investigate the differences in efficacy and safety between the vector vaccine ChAdOx1 nCoV-19/AZD1222 (Oxford-AstraZeneca) and mRNA-based vaccine mRNA-1273 (Moderna) in patients with AIRD, and to explore the cell-cell interactions between high and low anti-SARS-CoV-2 IgG levels in patients with rheumatic arthritis (RA) by single-cell RNA sequencing (scRNA-seq).

Methods: From September 16 to November 15, 2021, we consecutively enrolled 243 participants aged ≥20 years with AIRD who received COVID-19 vaccination, of whom 113 were immunized with AZD1222 and 130 with mRNA-1273. The level of serum IgG antibodies to the SARS-CoV-2 receptor-binding domain on the spike protein S1 subunit was quantified by electrochemiluminescence immunoassay at 4-6 weeks after vaccination. Moreover, peripheral blood mononuclear cells were isolated from two RA patient with high anti-SARS-CoV-2 IgG level and four RA patients with low level for scRNA-seq and cell-cell communication signal was analyzed by CellChat.

Results: The anti-SARS-CoV-2 IgG seropositivity rate was 78.8% (89/113) for AZD1222 and 83.1% (108/130) for mRNA-1273. The level of anti-SARS-CoV-2 IgG was higher in patients who received mRNA-1273 than in those who received AZD1222 (β: 30.15, 95% CI: 11.67-48.63, p=0.002) (Table 1). Prednisolone-equivalent dose >5 mg/day and methotrexate (MTX) use in AIRD patients, and non-anti-tumor necrosis factor (TNF)-α biologics and Janus kinase (JAK) inhibitor use in RA patients were associated with inferior immunogenicity. ScRNA-seq revealed CD16$^-$monocytes were predominant in RA patients with high anti-SARS-CoV2-IgG antibody level, and enriched pathways related to antigen presentation via major histocompatibility complex class II (MHC class II) were found (Figure 1). HLA-DRA and CD4 interaction was vigorous among all identified MHC-II pathway and was enhanced in high anti-SARS-CoV2-IgG antibody group.

Table 1. Multivariate analysis of anti-SARS-CoV-2 IgG level in patients with rheumatic diseases following COVID-19 vaccines

	Multivariate analysis			
	β	95% CI		*p* value
Medications				
Glucocorticoids				
Not used	Reference			
≤5 mg/day	−22.48	(−56.33,	11.37)	0.192
>5 mg/day	−23.45	(−43.54,	-3.36)	**0.022**
Methotrexate	−24.89	(−45.70,	-4.08)	**0.019**
Targeted therapies				
Targeted therapies group				
Not used	Reference			
TNF inhibitor	−15.78	(−41.33,	9.76)	0.224
Non-TNF bDMARD	−25.27	(−55.47,	4.93)	0.100
JAK inhibitor	−17.08	(−47.23,	13.07)	0.265
Vaccine				
ChAdOx1 nCoV-19/AZD1222	Reference			
mRNA-1273	30.15	(11.67,	48.63)	**0.002**

TNF: tumor necrosis factor, bDMARDs: biologic disease-modifying antirheumatic drugs, JAK: Janus kinase.

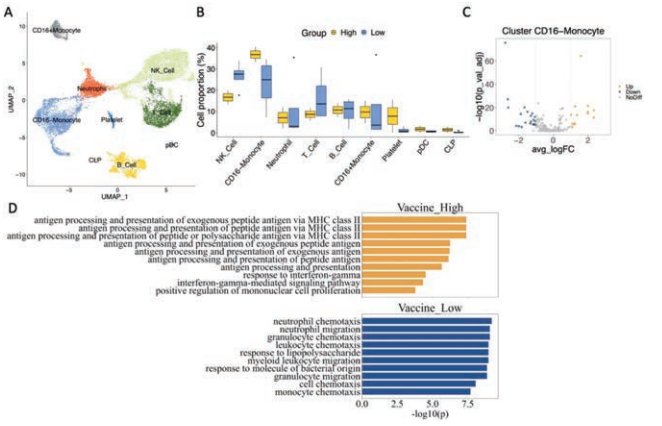

Figure 1. The comprehensive cell atlas of PBMC of RA patients with high and low anti-SARS-CoV2-IgG antibodies. A) UMAP visualization of PBMC cells from RA patients. B) The proportion of cell types between high and low antibody groups. C) Volcano plot of CD16-monocyte showed differential expressed genes. D) Pathway analysis between high and low antibody groups; PRBC: peripheral blood mononuclear cell, RA: rheumatoid arthritis, NK cell: natural killer cell, pDC: plasmacytoid dendritic cell, CLP: common lymphoid progenitor.

Conclusion: mRNA-1273 and AZD1222 vaccines exhibited differential immunogenicity in patients with AIRD. Enriched pathways related to antigen presentation via MHC class II in CD16$^-$monocytes might be associated with higher anti-SARS-CoV2-IgG level in RA patients and further study is warranted.

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