Background/Aims
Coronavirus Disease 2019 (COVID-19) is a global pandemic caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). International mass vaccination schemes are implemented to control the disease and reduce mortality. The data on serological immune response among rheumatology patients receiving immunosuppressive therapy following SARS-CoV-2 vaccines is very sparse. We present a case of a rheumatoid arthritis patient receiving rituximab (RTX) who developed fatal nosocomial COVID-19 infection despite receiving SARS-CoV-2 vaccine.

Methods
A 71-year-old Caucasian male with longstanding seropositive rheumatoid arthritis, interstitial lung disease with bullous emphysema, paraproteinemia, osteoporosis, anxiety, and depression. His treatment included hydroxychloroquine, sulfasalazine, oral prednisolone (2-5mg), and RTX every 6 months. He received his last cycle of RTX almost 8 weeks before vaccination. This gentleman received two doses of COVID-19 mRNA Vaccine (BioNTech-Pfizer) eleven weeks apart. Nine weeks after the second vaccination he was admitted with supraventricular tachycardia and heart failure. This admission coincided with a COVID-19 outbreak in the ward. Eight patients and one staff member tested (PCR) positive during regular ward screening. All patients were initially asymptomatic, and six of them were fully vaccinated. He was allowed to go home with advice to self-isolate for 10 days. Two days after discharge, he presented to the emergency department with shortness of breath, lethargy, and cough. The diagnosis was COVID-19 pneumonitis and pre-renal acute kidney injury. He received supplemental oxygen, dexamethasone, and intravenous co-amoxiclav. Unfortunately, he died from COVID-19 pneumonitis on his sixth day of admission. Our patient was the only one among the nine SARS-CoV-2 positive individuals who developed symptomatic disease.

Results
It is known that RTX along with other immune modulatory drugs reduce the response to some vaccines such as the seasonal flu vaccine, and it is expected that the same effect could be seen after COVID-19 vaccination. Octave study is evaluating immune responses in patients with a range of chronic rheumatic conditions on specific immunomodulatory and biologic treatments. This has shown the response to vaccine was dependent on the disease cohort, with 90% of those with RTX-treated antineutrophil cytoplasmic antibody (ANCA)-associated vasculitis and 54% of those with inflammatory arthritis responding less well than the baseline for healthy subjects. There is no evidence to suggest how long after RTX a patient should delay vaccination with a COVID-19 vaccine, but published consensus suggests 4-8 weeks.

Conclusion
More studies are needed to assess the response to SARS-CoV-2 vaccines among immunocompromised patients and the need for a third vaccine dose if antibodies level were low. The first approved monoclonal antibody treatment—Ronapreve® for treating and preventing acute covid-19 in adults, is a promising drug for poor vaccine responders who develop COVID-19 infection. This case also highlights the importance of infection control within hospital setting.

Disclosure
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