Response to 'Correspondence on 'Prevalence and clinical outcomes of COVID-19 in patients with autoimmune diseases: a systematic review and meta-analysis" by Gremese *et al*

We thank Gremese *et al*[1] for their suggestion in our research article entitled 'Prevalence and clinical outcomes of COVID-19 in patients with autoimmune diseases: a systematic review and meta-analysis'.[2] Their recent work described that lung perfusion CT scan identified perfusion abnormalities such as hyperperfusion around areas of hypoperfusion (leukothrombosis) in patients with COVID-19-associated pneumonia, even without respiratory distress.[3] They also demonstrated that in one of these patients, lung perfusion CT scan showed an improvement in parameters related to the perfusion abnormalities according to clinical improvement after starting treatments with enoxaparin and interleukin-6 inhibitor, without steroids.[1] They suggested that COVID-19-associated pneumonia might be attributed to hyperinflammation and/or leucothrombosis.

In our study, meta-regression analysis demonstrated that glucocorticoid (GC) use was significantly associated with a greater prevalence of COVID-19 in patients with autoimmune diseases (ADs). In terms of clinical outcomes, overall hospitalisation and mortality rates in patients with ADs were 35.2% (95% CI: 23.0%–49.7%) and 6.6% (95% CI: 3.6%–11.8%), respectively. In contrast, our subgroup meta-analysis according to medical therapies showed that hospitalisation and mortality rates in patients with ADs exposed to GCs were 56.0% (95% CI: 46.2%–65.3%) and 14.7% (95% CI: 10.2%–20.6%), respectively, suggesting that GCs would increase the risk of these severe outcomes of COVID-19. Meta-regression analysis also showed a higher proportion of GC use tended to be associated with a higher rate of hospitalisation (regression coefficient: 0.011, 95%CI: −0.0003 to 0.022, p=0.056) and death (regression coefficient: 0.011, 95%CI: −0.001 to 0.022, p=0.075), although this was not statistically significant.[2] The patients included in our study were likely on GCs for some time for their underlying ADs. Thus, our data showed the harmful effects of 'chronic' GC use on the risk of SARS-CoV-2 infection and severe COVID-19. As stated in the correspondence by Gremese *et al*,[1] the evidence regarding the effectiveness and safety of therapeutic GC use for patients with COVID-19 remains controversial.[4 5] The results of our study do not preclude the use of GCs such as dexamethasone for COVID-19-associated pneumonia and cytokine release syndrome in patients with ADs. The findings of Gremese *et al* are interesting and we agree that further investigations of the pathogenesis of COVID-19-associated pneumonia and the role of GCs as therapeutics in patients with ADs in such a setting are warranted.[1]

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