

# Pre-existing asthma as a comorbidity does not modify cytokine responses and severity of COVID-19

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## Abstract

**Background:** A significant portion of COVID-19 sufferers have asthma. The impacts of asthma on COVID-19 progression are still unclear but a modifying effect is plausible as respiratory viruses are acknowledged to be an important trigger for asthma exacerbations and a different, potentially type-2 biased, immune response might occur. In this study, we compared the blood circulating cytokine response to COVID-19 infection in patients with and without asthma. **Methods:** Plasma samples and clinical information were collected from 80 patients with mild (25), severe (36) or critical (19) COVID-19 and 29 healthy subjects at the John Radcliffe Hospital, Oxford, UK. The concentrations of 51 circulating proteins in the plasma samples were measured with Luminex and compared between groups. **Results:** Total 16 pre-existing asthma patients were found (3 in mild, 10 in severe, and 3 in critical COVID-19). The prevalence of asthma in COVID-19 severity groups did not suggest a clear correlation between asthma and COVID-19 severity. Within the same COVID-19 severity group, no differences were observed between patients with or without asthma on oxygen saturation, CRP, neutrophil counts, and length of hospital stay. The mortality in the COVID-19 patients with asthma (12.5%) was not higher than that in patients without asthma (17.2%). No significant difference was found between asthmatic and non-asthmatic in circulating cytokine response in different COVID-19 severity groups, including the cytokines strongly implicated in COVID-19 such as CXCL10, IL-6, CCL2, and IL-8. **Conclusions:** Pre-existing asthma was not associated with an enhanced cytokine response after COVID-19 infection, disease severity or mortality.

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