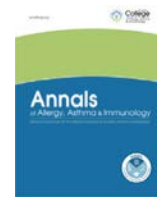




Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Correspondence

Eosinophilic inflammation, coronavirus disease 2019, and asthma Are inhaled corticosteroids the missing link?



We congratulate Dr Ho et al¹ on their work that further clarified the relationship between blood eosinophils, asthma, and the risk of severe coronavirus disease 2019 (COVID-19). They leveraged data from their large clinical network, which unlike others,^{2,3} includes outpatients diagnosed as having COVID-19. The authors effectively reveal that in asthma and in health, having a raised blood eosinophil count is protective against severe COVID-19 and associated mortality.

Clinicians have repeatedly noticed that the peripheral blood eosinophil count is low in inpatients with severe COVID-19.^{4,5} Eosinophil counts also improve as patients recover from their COVID-19 illness.⁵ Because the authors limited their data to the COVID-19 encounter of the patients, their conclusion that a high blood eosinophil count reduces the risk of mortality and hospitalization could simply be related to the suppression of blood eosinophil count in severe COVID-19. However, the authors try to account for this by using many surrogates for COVID-19 disease severity (blood and clinical markers), which could make their conclusions more robust.

We would be interested if the authors could comment on whether inhaled corticosteroid use explains the difference in risk between patients with and without asthma with a blood eosinophil count of greater than or equal to 200 cells/ μ L in their cohort.

We found the apparently increased protection of the raised blood eosinophil count among patients with asthma compared with patients without asthma (Table 4) in this cohort interesting.¹ Patients with asthma with a raised blood eosinophil count are more likely to derive benefit from inhaled corticosteroids,⁶ whereas others have found that the use of inhaled corticosteroids reduces the risk of hospitalization and mortality among patients with asthma who develop COVID-19.² Our phase 2 clinical trial also revealed that the initiation of inhaled corticosteroids early in COVID-19 can reduce the risk of clinical deterioration and prevent increased healthcare resource use.⁷

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References

1. Ho KS, Howell D, Rogers L, Narasimhan B, Verma H, Steiger D. The relationship between asthma, eosinophilia, and outcomes in coronavirus disease 2019 infection [e-pub ahead of print]. *Ann Allergy Asthma Immunol*. doi: <http://dx.doi.org/10.1016/j.anai.2021.02.021>, accessed March 18, 2021.
2. Bloom CI, Drake TM, Docherty AB, et al. Risk of adverse outcomes in patients with underlying respiratory conditions admitted to hospital with COVID-19: a national, multicentre prospective cohort study using the ISARIC WHO Clinical Characterisation Protocol UK [e-pub ahead of print]. *Lancet Respir Med*. doi:10.1016/S2213-2600(21)00013-8, accessed March 18, 2021.
3. Schultze A, Walker AJ, MacKenna B, et al. Risk of COVID-19-related death among patients with chronic obstructive pulmonary disease or asthma prescribed inhaled corticosteroids: an observational cohort study using the OpenSAFELY platform. *Lancet Respir Med*. 2020;8(11):1106–1120.
4. Zhang JJ, Dong X, Cao YY, et al. Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. *Allergy*. 2020;75(7):1730–1741.
5. Xie G, Ding F, Han L, Yin D, Lu H, Zhang M. The role of peripheral blood eosinophil counts in COVID-19 patients. *Allergy*. 2021;76(2):471–482.
6. Cowan DC, Taylor DR, Peterson LE, et al. Biomarker-based asthma phenotypes of corticosteroid response. *J Allergy Clin Immunol*. 2015;135(4):877–883. e1.
7. Ramakrishnan S, Nicolau DV, Langford B, et al. Inhaled budesonide in the treatment of early COVID-19 illness: a randomised controlled trial [e-pub ahead of print]. *Lancet Respir Med*. doi:10.1016/S2213-2600(21)00160-0, accessed April 9, 2021.

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