Does asthma affect outcomes of patients with COVID-19 infections?

To the Editor:

We have read with great interest the article entitled "Asthma prolongs intubation in COVID-19," recently published by Mahdavinia et al.[1]

This article has shown that asthma was independently associated with prolonged ventilation time in patients with COVID-19. In addition, asthma was associated with obesity, which, as the authors point out, "is another predictor of poor outcome in patients with COVID-19."

Allergic diseases, asthma, and chronic obstructive pulmonary disease were not found to be risk factors in a study conducted on 140 patients with severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in China. Asthma is a heterogeneous disease characterized by type 2 eosinophilic inflammation in more than 50% patients. Eosinophil count is decreased in the peripheral blood of patients infected with SARS-CoV-2. The increased eosinophil count in the airways of patients with asthma has been considered as a potential protective mechanism against the exaggerated inflammatory responses of severe COVID-19 phenotype.[2,3]

It is known that the level of angiotensin-converting enzyme 2 (ACE-2) in the lung tissues of patients with COVID-19 increases and is found to play an important role in the pulmonary involvement.[4] It is proposed that inhaled corticosteroids, as the essential component of asthma treatment, may have a positive impact on the prognosis of patients with COVID-19 by reducing the level of ACE-2 in lung tissues.[5]

We conclude that regularity and dosage of inhaled corticosteroid administration, as reported in the medical history of patients with asthma, may have an impact on the treatment outcomes. Although the analyses in the study of Mahdavinia et al[1] adjusted for albuterol and systemic steroids use, it would be important to know how many of the patients were being treated with inhaled corticosteroids and the outcomes in those patients. Moreover, although the authors state that "peripheral eosinophilia was assocaited with asthma" in their study, more information regarding the type of inflammation in the patients with asthma involved in this study would be enlightening with respect to asthma heterogeneity and COVID-19 outcomes.

Serdar Kalemci, MD[a]
Aydın Sarıhan, MD[b]
Arife Zeybek, MD[c]

[a]Department of Chest Diseases, Medical Park Gebze Hospital, Kocaeli, Turkey
[b]Department of Emergency Medicine, Manisa City Hospital, Manisa, Turkey
[c]Department of Chest Surgery, School of Medicine, Muğla Sıtkı Koçman University, Muğla, Turkey.

No funding was received for this work.
Conflicts of interest: The authors declare that they have no relevant conflicts of interest.
Received for publication August 13, 2020; Revised August 19, 2020; accepted for publication September 11, 2020.
Available online September 28, 2020.

Corresponding author: Aydın Sarıhan, MD, Emergency Department, Manisa City Hospital, Adnan Menderes District 132, Street No: 15, Şehzadeler, Manisa 45040, Turkey. E-mail: aydinsarihan@yahoo.com.

REFERENCES

1. Mahdavinia M, Foster KJ, Jauregui E, Moore D, Adnan D, Andy-Nweye AB, et al. Asthma prolongs intubation in COVID-19. J Allergy Clin Immunol Pract 2020;8:2388-91.
2. Zhang JJ, Dong X, Cao YY, Yuan YD, Yang YB, Yan YQ, et al. Clinical characteristics of 140 patients infected with SARS-CoV-2 in Wuhan, China. Allergy 2020;75:1730-41.
3. Carli G, Cecchi L, Stebbing J, Parronchi P, Farsi A. Is asthma protective against COVID-19? [published online ahead of print June 1, 2020]. Allergy. https://doi.org/10.1111/all.14426
4. Mason RJ. Pathogenesis of COVID-19 from a cell biology perspective. Eur Respir J 2020;55:2000607.
5. Maes T, Bracke K, Brusselle GG. COVID-19, asthma, and inhaled corticosteroids (ICS): another beneficial effect of ICS? Am J Respir Crit Care Med 2020;202:8-10.

http://dx.doi.org/10.1016/j.jaip.2020.09.019

Reply to "Does asthma affect outcomes of patients with COVID-19 infections?"

To the Editor:

We would like to thank Kalemci et al[1] for highlighting our paper published in the August issue of the *Journal of Allergy and Clinical Immunology: In Practice*.[2] The impact of COVID-19 on patients with asthma and their COVID-19 outcome has been a matter of several investigations in the past few months. As the authors mentioned, asthma is a heterogenic disease with several endotypes, which may respond to infectious processes differently. Our results are in agreement with other papers that were published in the following month showing that asthma does not decrease or increase hospitalization rate and length for COVID-19.[3] Additional studies showed that atopy might play an important role in the response to severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Our follow-up large 2-center study has also shown that atopy is a potential protective factor and a positive prognostic factor for decreased severity of COVID-19.[4] Furthermore, we have found that, among different endotypes of asthma, only nonallergic asthma was associated with prolonged need for intubation,[4] which agrees with a recent comprehensive large study.[5] This study showed that nonallergic asthma was associated with a higher risk of severe COVID-19.[5] This is also consistent with translational studies. Although gene expressions of 2 key mediators for SARS-CoV-2 infection, angiotensin-converting enzyme 2 (ACE2) and transmembrane protease serine 2 (TMPRSS2), have been shown to be different in allergic individuals, potentially protecting them from severe illness, in a large study in which all patients with asthma were combined together, the expression of both genes was similar between patients with asthma and healthy subjects.[6] This indicates that asthma in general is not a risk factor for more or less severe COVID-19 illness. However, as a chronic lung disease prone to viral-induced exacerbation, this might place those with severe COVID-19 at risk for a longer duration of pulmonary inflammation.[2,5] Furthermore, an allergic background and differential expression of ACE2 and TMPRSS2 may dampen the strong inflammatory response to SARS-CoV-2 in patients with allergic asthma, leading to the lack of increased severity reported in patients with nonallergic asthma.[2,4,5]