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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Letter to the Editor

Severe forms of COVID-19 among patients with chronic respiratory diseases: be attentive to the severity of the underlying respiratory impairment

Dear Editor, we appreciate Ausset *et al.*, consideration of our study in their letter reminding us of the very recent literature related to a protective role of chronic respiratory diseases, especially asthma and chronic obstructive pulmonary disease (COPD). As stated in the letter, the meta-analysis by Rogliani *et al.*, included 8476 hospitalized patients for SARS-CoV-2 infection and found that patients with asthma and COPD were at reduced risk of hospitalization [1]. Another meta-analysis showed opposite results [2]. These data should be interpreted with great caution as they do not consider the severity of the underlying respiratory disease. Indeed and as well explained in the letter by Ausset *et al.*, it is now clear that patients with the most severe form of asthma and COPD have a high risk of developing a severe form of COVID-19 (*i.e.*, requiring invasive mechanical ventilation) [3]. Our results are consistent with this since, as mentioned in our article, our population did not include patients with severe asthma and only three patients with COPD had long-term oxygen therapy.

The letter by Ausset *et al.*, also has the merit of summarizing the literature in favor of a protective role for inhaled corticosteroids (ICS) in SARS-CoV-2 pneumonia. Most of the quoted articles only included outpatients without specifically addressing patients with chronic respiratory diseases. The novelty of our study is to have included patients hospitalized in the COVID-19 ward and accurately characterize patients with COPD or asthma. As stated by Ausset *et al.* in their letter, a randomized controlled and multicentric trial included 4700 outpatients at high risk of complications with a recent COVID-19 infection and revealed that ICS improved time to recovery [4]. A recent meta-analysis supported the benefit of ICS in resolving clinical symptoms in non-hospitalized patients with COVID-19 [5]. In contrast, in a post-hoc analysis of over 8 million patients, two or more prescriptions of ICS led to a slightly higher risk of severe COVID-19 [6]. As hypothesized in our article, ICS may have potential clinical effect in SARS-CoV-2 infection through various pathophysiological mechanisms. For example, Milne *et al.* demonstrated a downregulation of the expression of genes involved in SARS-CoV-2 infection in bronchial epithelial cells of patients with COPD by budesonide [7]. However, the clinical relevance of these *in vitro* findings remains to be clarified.

In conclusion, on the one hand, asthma and COPD seem to protect against COVID-19 depending on the severity of the underlying chronic respiratory disease. On the other hand, ICS could have a protective role but only the results of ongoing randomized controlled trials will confirm this hypothesis.

Declaration of Competing Interest

None.

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