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Short communication

Asthma prevalence in patients with SARS-CoV-2 infection detected by RT-PCR not requiring hospitalization

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ABSTRACT

Introduction: The prevalence of asthma in patients hospitalized with SARS-CoV-2 has been studied and varies widely in the different series. However, the prevalence in SARS-infected patients not requiring hospitalization is not known. The objective of this study was to analyze the presence of asthma in a consecutive series of patients who tested positive in the RT-PCR assay for SARS-CoV-2 and did not require hospital admission.

Methods and results: A total of 218 patients (58% of those who tested positive) did not require hospitalization; they had a median age of 45 years (IQR 34–57) and 57% were female. Six patients (2.8%) had a previous diagnosis of asthma. Only one patient developed a mild aggravation of asthma symptoms associated with SARS-CoV-2 infection.

Conclusions: Few patients with asthma were infected by SARS-CoV-2, and this infection was not a significant cause of asthma exacerbation.

1. Introduction

Viral infections are a very common cause of asthma exacerbation [1,2]. Rhinovirus, respiratory syncytial virus, influenza virus, human parainfluenza virus and metapneumovirus have been reported triggers of asthma aggravation [2], and almost one third of patients admitted for influenza suffered from asthma [3]. In light of these data, it would seem inevitable to identify asthma as a potential risk factor for COVID-19 [4]. However, during the SARS-CoV-2 pandemic the reports of series from China and Italy showed that very few patients infected with this virus had asthma [5–7]. This finding raised the suspicion that asthma or its treatment might have a protective effect against infection [8]. Nevertheless, series from the New York area and the UK reported opposite results. In New York, 9% of hospitalized patients with COVID-19 had asthma [9], and in the UK 14% were asthmatic patients [10]. In view of the disparity in the data we had previously analyzed our hospitalized COVID-19 patients (not necessarily with positive RT-PCR) and found that 2.4% of them were diagnosed with asthma [11].

However, all of these asthma frequency data are derived from inpatient series. The frequency of illness may be different in patients with SARS-CoV-2 infection who do not require hospital admission. For this reason we have analyzed the presence of asthma in a consecutive series of patients who tested positive in the RT-PCR assay [12] for SARS-CoV-2 and did not require hospital admission.

2. Patients and methods

This was an observational, retrospective study. The recruitment period was from March 3 to April 12, 2020. SARS-CoV-2 RT-PCR tests were performed by experienced personnel in a single centralized laboratory accordingly to international guides [12]. All consecutive patients older than 14 years of age that tested positive for SARS-CoV-2 were included in the analysis. The electronic health record of each case was reviewed and those patients with a diagnosis of asthma established by a physician (regardless of method) and with prescribed asthma therapy where recorded. Comparisons were made using Mann-Whitney *U* test

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and chi-squared test. A p value less than 0.05 was considered significant. The study was approved by the local ethics committee.

3. Results

A total of 376 patients tested positive for RT-PCR SARS-CoV-2, the median age was 54 years with an interquartile range (IQR) of 42–69, and 184 (49%) were female. Of these patients, 158 (42%) required hospitalization, the median age was 68 years (IQR- 55–75); predominantly male (n = 99, 63%). The remaining 218 (58%) patients did not require hospitalization; they had a median age of 45 years (IQR 34–57) and 57% were female (125, versus 93 male). Compared to patients requiring hospitalizations, non-hospitalized patients were younger ($p < 0.001$) and more frequently female ($p < 0.001$).

Of the total patients, 10 (2.7%) had a previous diagnosis of asthma with prescribed medication for this disease. In all cases, the asthma was under control (no unscheduled visits in the previous six months). Four of these asthmatic patients were admitted to the hospital with bilateral pneumonia due to COVID-19 (2.5% of admissions; previously reported [11]). The remaining six patient did not require hospitalization (one was asymptomatic and five had mild symptoms). These six asthmatic patients represent 2.8% of all of positive RT-PCR SARS-CoV-2 individuals that did not require hospitalization. The characteristics of the patients with asthma are detailed in Table 1. Three patients did not receive inhaled corticosteroids and three did. The only patient who received a biologic for asthma (in addition to other drugs) did not develop symptoms from SARS. Only one patient developed aggravation of asthma symptoms associated with SARS-CoV-2 infection. This patient was treated at home by his family physician with a short course of oral steroids, budesonide and salbutamol, and recovered.

4. Discussion

In our experience, asthma prevalence in patients with laboratory-confirmed SARS-CoV-2 infection is very low, similar to that described in COVID-19 patients in China or Italy and much lower than in the UK or USA. Very interestingly, we found that in only one patient with asthma, the isolation of SARS-CoV-2 was associated with a moderate exacerbation of the disease.

The infrequency of asthmatics being affected by this disease in several series has led some authors to suggest that perhaps inhaled corticosteroids play a protective role [8,13]. In fact, in vitro studies have shown that corticosteroids inhibit viral-induced cytokines, but do not inhibit interferons, an important mechanism of antiviral defence [1]. Specifically, inhaled corticosteroids with or without bronchodilators are able to inhibit coronavirus replication [14]. However, current expert guidelines do not recommend the use of corticosteroids in the treatment of COVID-19 in patients in general [15].

In addition to the low frequency obtained in our study, our data suggest that infection with SARS-CoV-2 is not significantly associated with asthma exacerbation. Although it is known that viral respiratory infections can act as triggers for acute asthma exacerbations [2] only one of our patients had a moderate aggravation of the disease.

In conclusion, in our experience, very few patients with asthma were infected by SARS-CoV-2, and this infection was not a significant cause of asthma exacerbation. However, discrepancies in the frequency of asthma in different countries and its role in disease severity need to be elucidated.

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Table 1
Characteristics of patients with asthma.

Number	Age	Gender	Asthma therapy	Symptoms with SARS-CoV-2 infection
1	62	M	SABA	Cough Low-grade fever
2	60	F	LABA-ICs	Fever Muscle pain
3	29	F	LABA-ICs	Cough Low-grade fever
4	43	F	SABA	Cough Low-grade fever
5	54	F	LABA-ICs Montelukast Omalizumab	Asymptomatic
6	28	F	SABA	Low-grade fever and asthma exacerbation

F: female. M: male. LABA: long-acting beta-agonist. ICs: Inhaled corticosteroids. SABA: short-acting beta-agonist.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

CRediT authorship contribution statement

Eduardo Garcia-Pachon: Conceptualization, Methodology, Writing - original draft, Supervision, Writing - review & editing. **Lucia Zamora-Molina:** Writing - review & editing. **Maria J. Soler-Sempere:** Writing - review & editing. **Carlos Baeza-Martinez:** Writing - review & editing. **Justo Grau-Delgado:** Writing - review & editing. **Vicente Canto-Reig:** Writing - review & editing. **Antonio Ramon-Sanchez:** Writing - review & editing. **Isabel Padilla-Navas:** Writing - review & editing. **Montserrat Ruiz-Garcia:** Writing - review & editing. **Nieves Gonzalo-Jimenez:** Conceptualization, Writing - review & editing.

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