

The influences of COVID-19 on the prevalence of acute asthma exacerbation and its etiology

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Abstract

Background: Viral respiratory infections are an important cause of increased pulmonary symptoms in children and adults with pre-existing asthma. Viral infection is responsible for up to 80% of exacerbations in children and more than 50% in adults. Human rhinovirus (HRV) is known as one of the most important and prevalent respiratory pathogens. A deeper understanding of the association between COVID-19 and asthma and the examination of HRV coinfections in SARS-CoV-2 patients will likely shed light on the pathogenesis and clinical features of COVID-19 and improve our understanding of polymicrobial infection associated with COVID-19.

Objectives: To determine the prevalence of asthma exacerbation before and during the COVID-19 pandemic and to investigate the co-infections with human rhinovirus (HRV) among COVID-19 asthmatic patients in Jordan.

Methods: The data of this retrospective study, divided into two groups (A and B), consisted of clinical variables. During the first visit, and after 14-days, nasopharyngeal swabs were taken from group A (asthmatic patients with suspected COVID-19) and the quantitative polymerase chain reaction was performed to detect HRV and SARS-CoV-2. XVI

Group B term is used for asthma patients not infected with SARS-CoV-2 at the time of recruitment.

Results: Among group A, a total of 175 COVID-19 cases were reported, 47/175 adults (26.9%) have been diagnosed with asthma. The majority of the included asthmatic patients (61.7%) were positive only for SARS-CoV-2 and 38.3% were positive for both SARS-CoV-2 and HRV. The SARS-CoV-2 cycle threshold value was lower in samples infected with both viruses compared to samples infected with SARS-CoV-2 alone, $p < 0.005$. For group B (27 patients) 62.9% ($n = 17$) were stable and 37% ($n = 10$) were at exacerbation. The number of asthma exacerbations was higher, for both groups ($N = 74$), during 2021 than in 2020 ($p = 0.003$).

Conclusions: Our findings indicate that HRV and SARS-CoV-2 were significantly more prevalent in asthma exacerbations than stable asthma. Thus, HRV and SARS-CoV-2 infections were potentially cofactors or contributors to the asthma exacerbation in this Jordanian cohort. This is the first study, in Jordan, to investigate the HRV co-infection in COVID-19 asthmatic patients and HRV could be associated with the more severe form of COVID-19.