Chronic Diseases Journal

DOI: 10.22122/cdj.v8i2.517 Published by Vesnu Publications

COVID-19 and Asthma: What comments we need to know?

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Short Communication

Abstract

BACKGROUND: Asthma is a common chronic inflammatory respiratory disease more common in children. Microbial agents such as viruses are a common trigger of asthma. Coronavirus disease 2019 (COVID-19) is a pandemic disease that could lead to the exacerbation of allergic disorders such as asthma. The aim of this study is to write a narrative review of COVID-19 and asthma condition.

METHODS: We searched in Google scholar, PubMed, and Scopus databases with keywords COVID-19, asthma, corticosteroid, and inhaled steroids.

RESULTS: We found a few original articles on the combined subject of asthma and COVID-19. More than 50% of our data is expert comments at valid websites such as https://www.AAAAI.org or https://ginasthma.org. The typical treatment recommended in the exacerbation of asthma or chronic obstructive pulmonary disease (COPD) included the use of corticosteroids. The routine use of corticosteroids in patients with COVID-19 without obstructive lung disease is not advised, as it may prolong viral replication.

CONCLUSION: Patients with asthma need to continue on their preventive asthma medication, such as inhaled corticosteroids (ICS) in pandemic COVID-19.

KEYWORDS: COVID-19; Asthma; Therapeutics; Steroids

Date of submission: 19 Sep. 2019, ***Date of acceptance:*** 22 Nov. 2019

Citation: Ghaffari J, Dabbaghzadeh A, Ghaffari N. **COVID-19 and Asthma: What comments we need to know?** Chron Dis J 2020; 8(2): 94-8.

Introduction

Betacoronavirus named 2019 novel coronavirus (2019-nCoV) or severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) causing coronavirus disease 2019 (COVID-19) is a pandemic that can involve all people. Generally, clinical manifestations of COVID-19 are fever, cough, nausea, vomiting, diarrhea, myalgia, and fatigue. Laboratory abnormalities are leukopenia, thrombocytopenia, increased aspartate aminotransferase (AST) and alanine aminotransferase (ALT) levels, creatine kinase or lactate dehydrogenase enzymes, C-reactive protein (CRP), and erythrocyte sedimentation rate (ESR).[1] Patients with asthma have a great fear of the worse consequences. Asthma is a common disease in the world involving more than 300 million people wordlwide.[2-4] Although asthma does not affect intelligence quotient (IQ), it has some degree of morbidity, mortality, and a high burden on the family and country.[5,6] Etiology of asthma is not exactly clear, however the genetic and environmental factors are involved in this complication.[7-9] Viral infections include respiratory syncytial virus (RSV), influenza, parainfluenza, adenovirus, coronavirus, and enterovirus, which are common triggers of asthma exacerbation.[10] Currently, based on the evidence, there is not increased infection rates of COVID-19 in those with asthma. The Centers for Disease Control and Prevention

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(CDC), United States statements revealed that there is a higher risk of severe diseases in moderate to severe asthma.[11] Asthma management includes allergen avoidance, short-acting beta2 adrenergic agents, long-acting beta2 agonist agents, inhaled corticosteroids (ICS), systemic steroids, specific immunotherapy, etc.[12-14] At present, there is a lack of data on the use of steroids in treating asthma.[15] ICS might be increasing the risks of respiratory infections in patients with asthma. Higher doses of ICS induces more risk of respiratory infections. In contrast, there is some evidence that ICS may also reduce some respiratory infections. For example, formoterol and budesonide may inhibit rhinovirus infection.[11]

Materials and Methods

We searched in Google scholar, PubMed, and Scopus databases with keywords COVID-19, asthma, corticosteroid, and inhaled steroids. We found a few articles and wrote a narrative review article. Some of them were full-text articles and others were expert comments. We did not have a limitation on time. Each of the articles contained English abstract and full-text, and expert comments were included in this review.

Results

We found a few original articles on the combined subject of asthma and COVID-19. Because COVID19 is a new virus with the first outbreak since 3 months ago, we expected that there are a few articles on COVID-19 and asthma together. More than 50% of the data used in this review is expert comments at valid websites such as https://www.AAAAI.org or https://ginasthma.org. Although some of our data were of a weak quality, some high-quality data could be helping us in our work.

Discussion

Moore from American Academy of Allergy, Asthma & Immunology (AAAAI) believed that the controller medications of ICS should not be stopped. Useless of maintenance medication will put the patient at risk for developing an asthma exacerbation.[15] ICSs are commonly considered as a safe treatment for controlling asthma and would reduce the risk of an asthma attack by viruses for example COVID-19. This comment has a weak medical evidence base.[11] COVID-19 may be higher in asthma and induce an asthma attack, pneumonia, and acute respiratory disease. Because there is no specific treatment of COVID-19 currently, preventive ways are the best management methods for this virus.[16] Patients with asthma should continue their ICS during the COVID-19 epidemic even while prescribing oral corticosteroids. Because, stopping ICS is often leads to a potential risk of an asthma attack. Therefore, keep your treatment, and in more severe conditions, follow the instructions on your asthma action plan. These recommendations apply to both adults and children with asthma.[17] According to the CDC recommendations, patients with asthma are among those at a higher risk of COVID-19. Asthma experts recommend that patients must keep using their preventive inhalers during this pandemic because the first defensive action against this infection is the proper control of asthma. Mitchell Grayson from Asthma and Allergy Foundation of America (AAFA) and Michael Blaiss from American College of Allergy, Asthma and Immunology (ACAAI) believed that patients with asthma need to continue their preventive steroids.[18] In an experience in China, it was identified that prolonged and high-dose corticosteroid is a great risk factor for COVID-19 death, therefore, the corticosteroid should not be used for the management of COVID-19-induced lung injury or shock.[18] Patients with asthma who stay on their preventive medication do not have more

severe problems and more hospitalizations with COVID-19.[18] Generally, corticosteroid is not recommended for the treatment of COVID-19 pneumonia.[19] But, corticosteroids associated with ventilator support should be considered for patients with severe conditions to prevent development of acute respiratory distress syndrome (ARDS).[20] In a study, 25 (69.44%) of 36 patients were treated with glucocorticoids.[21] Systemic steroids such as cortisone, prednisolone, and dexamethasone along with fluticasone (ICS) did not suppress viral growth. Ciclesonide and mometasone also suppressed replication of other coronaviruses, HCoV-229E, and SARS-CoV, but not the replication of respiratory syncytial virus (RSV) or influenza virus. Ciclesonide is a safe drug that can be administered to infants at high concentrations.[22] There is little data that asthma is more common among patients with COVID-19 or vice versa, the COVID-19 is more common in patients with asthma. In a study, 9/140 of patients with COVID-19 were also with asthma complication.[23] In a study in South Korea, asthma was not common in patients with COVID-19.[24] The prevalence of asthma is not common among patients with COVID-19, with the estimated prevalence of only 4.2%.[25]

Patients with asthma and COVID-19 infection would continue to treat asthma according to present asthma guidelines,[14] which the inhaler method is better for the treatment of asthma. Nebulizer is not suggested because of its contamination and spreading viruses, therefore, metered-dose inhaler (MDI) is better.[26] Biological agents such as anti-Interleukin (IL)-5, anti-IL-4/IL-13, and anti-IgE are recommended in the treatment of asthma.[27,28] Partially controlled or uncontrolled asthma is a particular risk for COVID-19 because the virus has more tendency to involve the respiratory tract.[29] Table 1 shows a triage approach to asthma management during the COVID-19 pandemic.

Table 1. Triage approach to patients with an asthma exacerbation during a pandemic

Patient condition	Action
High COVID risk Low asthma severity risk	Appropriately tested per CDC and state protocols with telehealth management of asthma
High COVID risk High asthma severity risk or uncertain diagnosis	Need for face to face evaluation with potential availability of PPE and negative pressure isolation if an aerosol generating procedure is anticipated
Low COVID risk Low asthma severity risk	Telehealth management
Low COVID risk High asthma severity risk or uncertain diagnosis	Need for face to face evaluation which may occur in primary care or allergy clinic

PPE: Personal protective equipment; CDC: Centers for Disease Control and Prevention; COVID: Coronavirus

Corticosteroids are the typical treatment recommended in asthma or chronic obstructive pulmonary disease (COPD) exacerbation. The routine use of corticosteroids in patients with COVID-19 without obstructive lung disease is not advised as it may prolong viral replication.30,31 Moreover, Eric Macy believed that the treatment of asthma exacerbations in people with COVID-19 is the same as with any other virally induced asthma attack.32 The role of corticosteroids is unclear; while current international consensus and World health Organization (WHO) do not recommend them, Chinese guidelines do recommend short term therapy with low-to-moderate dose corticosteroids in COVID-19 ARDS.[33-35] Uncontrolled, moderate to severe asthma is a risk factor for COVID-19 infection.[36]

There are not enough high quality articles on COVID-19 and asthma reciprocal effect. This was the main limitation of this study.

Conclusion

Patients with asthma need to continue on their preventive asthma medication, such as inhaled corticosteroids in pandemic COVID-19. The claim that patients with asthma are at higher

risk of contracting COVID-19 is not clear. Among ICSs, Ciclesonide is a safe drug and can be administered to infants at high concentrations. MDIs were suggested, but not nebulizer.

Conflict of Interests

Authors have no conflict of interests.

Acknowledgments

The authors would like to appreciate the physicians, nurses, and all healthcare workers and support staff who are risking their own health to care for us especially against COVID-19.

References

1. Lupia T, Scabini S, Mornese PS, Di Perri G, De Rosa FG, Corcione S. 2019 novel coronavirus (2019-nCoV) outbreak: A new challenge. J Glob Antimicrob Resist 2020; 21: 22-7.
2. Ghaffari J, Aarabi M. The prevalence of pediatric asthma in the Islamic Republic of Iran: A review and meta-analysis. J Pediatr Rev 2013; 1(1): 2-11.
3. Zamanfar D, Gaffari J, Behzadnia S, Yazdani-Charati J, Tavakoli S. The Prevalence of Allergic Rhinitis, Eczema and Asthma in Students of Guidance Schools in Mazandaran Province, Iran. Open Access Maced J Med Sci 2016; 4(4): 619-23.
4. Ghaffari J, Mohammadzadeh I, Khalilian A, Rafatpanah H, Mohammadjafari H, Davoudi A. Prevalence of asthma, allergic rhinitis and eczema in elementary schools in Sari (Iran). Caspian J Intern Med 2012; 3(1): 372-6.
5. Ghaffari J, Abbaskhanian A, Jalili M. IQ scores of children with moderate asthma: A comparison with healthy children. Oman Med J 2014; 29(1): 71-4.
6. Ghaffari J, Hadian A, Daneshpoor S, Khademloo M. Asthma burden in the hospitalized patients in north of Iran. Int J Pediatr 2014; 2(4): 257-66.
7. Hatami H, Ghaffari N, Ghaffari J, Rafatpanah H. Role of cytokines and chemokines in the outcome of children with severe Asthma. J Pediatr Rev 2019; 7(1): 17-28.
8. Aghajani M, Rafiei A, Ghaffari J, Valadan R, Kardan M. Immune dysregulation in children with allergic asthma, a close relationship between IL-17 but not IL-4 or IFN-g, and Disease Severity. Res Mol Med 2018; 6(1): 16-29.
9. Kardan M, Ghaffari J, Valadan R, Rafiei A, Soltani M, Aghajani M, et al. T-bet and GATA-3 Gene Expression in Children with Allergic Asthma and Healthy Controls. J Mazandaran Univ Med Sci 2017; 26(146): 9-21. [In Persian].
10. Farid Hossaini R, Ghaffari J, Ranjbar A, Haghshenas MR, Rafatpanah H. Infections in children with Asthma. J Pediatr Rev 2013; 1(1): 25-36.
11. Hartmann-Boyce J, Hobbs R. Inhaled steroids in Asthma during the COVID-19 Outbreak [Online]. [cited 2020]; Available from: URL: https://www.cebm.net/covid-19/inhaled-steroids-in-asthma-during-the-covid-19-outbreak
12. Ghaffari J, Ashrafi H, Ranjbar AR, Nazari Z. Vitamin E in children with asthma: A review. J Pediatr Rev 2014; 2(2): 57-65.
13. Ghaffari J, Farid Hossiani R, Khalilian A, Nahanmoghadam N, Salehifar E, Rafatpanah H. Vitamin e supplementation, lung functions and clinical manifestations in children with moderate asthma: A randomized double blind placebo-controlled trial. Iran J Allergy Asthma Immunol 2014; 13(2): 98-103.
14. Global Initiative for Asthma (GINA). 2019 GINA Report, Global Strategy for Asthma Management and Prevention [Online]. [cited 2019]; Available from: URL: https://ginasthma.org/reports/2019-gina-report-global-strategy-for-asthma-management-and-prevention
15. American Academy of Allergy Asthma and Immunology (AAAAI). COVID-19 and Asthma: What patients need to know [Online]. [cited 2020]; Available from: URL: https://www.aaaai.org/conditions-and-treatments/library/asthma-library/covid-asthma
16. Hartmann-Boyce J, Hobbs R. Inhaled Steroids in Asthma during the COVID-19 Outbreak [Online]. [cited 2020]; Available from: URL: https://www.cebm.net/covid-19/inhaled-steroids-in-asthma-during-the-covid-19-outbreak/
17. Global Initiative for Asthma (GINA). COVID-19: GINA answers to frequently asked questions on asthma management [Online]. [cited 2020]; Available from: URL: https://ginasthma.org
18. Johnson K. Asthma Patients: Stay on steroids in face of COVID-19, Say Experts [Online]. [cited 2020]; Available from: URL: https://www.medscape.com/viewarticle/927264
19. Wu F, Zhao S, Yu B, Chen YM, Wang W, Song ZG, et al. A new coronavirus associated with human respiratory disease in China. Nature 2020; 579(7798): 265-9.
20. Xu Z, Shi L, Wang Y, Zhang J, Huang L, Zhang C, et al. Pathological findings of COVID-19 associated with acute respiratory distress syndrome. Lancet Respir Med 2020; 8(4): 420-2.

21. Huang Y, Yang R, Xu Y, Gong P. Clinical characteristics of 36 non-survivors with COVID-19 in Wuhan, China [Online]. [cited 2020]; Available from: URL: https://www.medrxiv.org/content/10.1101/2020.02.27.20029009v2
22. Matsuyama S, Kawase M, Nao N, Shirato K, Ujike M, Kamitani W, et al. The inhaled corticosteroid ciclesonide blocks coronavirus RNA replication by targeting viral NSP15 [Online]. [cited 2020]; Available from: URL: https://www.biorxiv.org/content/10.1101/2020.03.11.987016v1
23. 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.
24. Report on the Epidemiological Features of Coronavirus Disease 2019 (COVID-19) Outbreak in the Republic of Korea from January 19 to March 2, 2020. J Korean Med Sci 2020; 35(10): e112.
25. Huang K, Yang T, Xu J, Yang L, Zhao J, Zhang X, et al. Prevalence, risk factors, and management of asthma in China: A national cross-sectional study. Lancet 2019; 394(10196): 407-18.
26. Amirav I, Newhouse MT. Transmission of coronavirus by nebulizer: A serious, underappreciated risk. CMAJ 2020; 192(13): E346.
27. Desai M, Oppenheimer J, Lang DM. Immunomodulators and biologics: Beyond stepped-care therapy. Clin Chest Med 2019; 40(1): 179-92.
28. Denman S, Ford K, Toolan J, Mistry A, Corps C, Wood P, et al. Home self-administration of omalizumab for chronic spontaneous urticaria. Br J Dermatol 2016; 175(6): 1405-7.
29. Cowl C. Bending the curve': A pulmonologist's perspective on COVID-19 [Online]. [cited 2020]; Available from: URL: https://www.healio.com/pulmonology/practice-management/news/online/%7B7d9f0bce-b191-45e0-a078-d95c51032324%7D/bending-the-curve-a-pulmonologists-perspective-on-covid-19
30. Shaker MS, Oppenheimer J, Grayson M, Stukus D, Hartog N, Hsieh EWY, et al. COVID-19: Pandemic contingency planning for the allergy and immunology clinic. J Allergy Clin Immunol Pract 2020.
31. Shaker MS, Oppenheimer J, Grayson M, Stukus D, Hartog N, Hsieh EW. COVID-19: Pandemic Contingency planning for the allergy and immunology clinic [Online]. [cited 2020]; Available from: URL: https://education.aaaai.org/sites/default/files/COVID19_US%20FINAL.pdf
32. American Academy of Allergy Asthma and Immunology (AAAAI). COVID-19 and Asthma [Online]. [cited 2020]; Available from: URL; https://www.aaaai.org/ask-the-expert/19-asthma
33. Russell CD, Millar JE, Baillie JK. Clinical evidence does not support corticosteroid treatment for 2019-nCoV lung injury. Lancet 2020; 395(10223): 473-5.
34. Zhao JP, Hu Y, Du RH, Chen ZS, Jin Y, Zhou M, et al. Expert consensus on the use of corticosteroid in patients with 2019-nCoV pneumonia. Zhonghua Jie He He Hu Xi Za Zhi 2020; 43(3): 183-4.
35. Singhal T. A review of coronavirus disease-2019 (COVID-19). Indian J Pediatr 2020; 87(4): 281-6.
36. Centers for Disease Control and Prevention. (CDC) Coronavirus (COVID-19) [Online]. [cited 2020]; Available from: URL: https://www.cdc.gov/coronavirus/2019-ncov/index.html