



Pediatric Asthma & Coronavirus (COVID-19)-Clinical Presentation in an Asthmatic Child—Case Report

Zakaria Barsoum¹

Accepted: 11 May 2020 / Published online: 19 May 2020
© Springer Nature Switzerland AG 2020

Abstract

Pandemic coronavirus (COVID-19) is a novel virus that causes severe pneumonia. Elderly people with co-morbidities are at risk of severe disease. Symptoms are generally milder in children. We present an asthmatic 12-year old girl with cough, wheeze, and mild pneumonia due to COVID-19. Reverse transcription (RT) polymerase chain reaction (PCR) confirmed COVID-19 on nasopharyngeal sample. Chest radiograph revealed bronchopneumonia. Frequent salbutamol inhalers were administered for treatment. Case was discharged home 2 days following hospitalization. COVID-19 may present with mild pneumonia in children or with an exacerbation of asthma in asthmatic children. Additional observations of clinical presentations of COVID-19 in children are recommended.

Keywords Coronavirus (COVID-19) · Asthma

Introduction

Coronavirus disease 2019 (COVID-19) is a respiratory tract infection caused by a newly emergent coronavirus that was first recognized in Wuhan, China, and is closely linked to the Severe Acute Respiratory Infection (SARS) virus. [1] COVID-19 causes mild disease in the majority of cases; however, approximately 14% develops severe disease requiring hospitalization and oxygen support, and 5% requires admission to an intensive care unit. [1] Complications include acute respiratory distress syndrome (ARDS), sepsis, septic shock, and multi-organ failure [2] and the risk is higher in old age groups with comorbidities such as asthma, diabetes, and heart disease [3]. Critically ill patients will require mechanical ventilation [2, 4, 5]. Hypotonic solutions should be avoided in the management of COVID-19 [4]. The most common diagnosis in severe COVID-19 patients is severe pneumonia.

To date, little is known about clinical presentation in children and infants where cough and fever are generally milder than adults and viral co-infection may occur [5–7].

Specimens from both the upper respiratory tract (URT; nasopharyngeal and oropharyngeal) AND, from the lower respiratory tract (LRT) when available such as sputum and endotracheal aspirate, are most preferably and should be sent for COVID-19 virus testing by reverse transcription real-time- (RT)-polymerase chain reaction (PCR) and for bacterial cultures. Viral shedding in survivors was 37 days at the longest [3, 8].

Two negative URT and LRT samples, at least 24 h apart, may indicate viral clearance in hospitalized and clinically recovered patients; LRT are more likely to be positive and for a longer period [9].

There is no current evidence to recommend any specific anti-COVID-19 treatment for patients with confirmed COVID-19.

No evidence to date suggests that young people with asthma are at increased risk for COVID-19 infection [10, 11]. However, there is a theoretical possibility that a child with asthma infected with COVID-19 could experience an asthma exacerbation and serious morbidity due to combined effects on the respiratory tract [10, 11].

This article is part of the Topical Collection on *Covid-19*

✉ Zakaria Barsoum
Zakaria.barsoum@westerntrust.hscni.net

¹ Paediatric Department, South West Acute Hospital, 124 Irvinestown Rd, Enniskillen BT 74 6DN, Northern Ireland

Case Report

Presentation

We present a 12-year old girl with confirmed COVID-19 with the underlying diagnosis of asthma, who presented initially

with low grade fever of 37.7°, cough, wheeze, and breathing difficulty. Case has been on symbicort two puffs twice daily plus salbutamol as required for asthma management. Case presented to general practitioner who increased symbicort to 4 puffs twice daily and placed child on 2 puffs two hourly of salbutamol. Heart rate was 100 beat/min, respiratory rate 25/min with wheeze and chest tightness on auscultation. The girl was able to speak and feed. No signs of convulsion or lethargy or unconsciousness. No history of travel or contact with an index case of COVID-19 was noted. O₂ saturation was > 90% in room air. Case was classified as mild pneumonia as defined by World Health Organization (WHO) classification (severe pneumonia in children: cough or difficulty in breathing plus at least one of the following: SpO₂ ≤ 90% in room air, breathing rate ≥ 30 breaths/min for age in our case, severe respiratory distress: grunting, very severe chest indrawing) (WHO interim guidance on the management of SARS when COVID-19 disease is suspected, 13 March 2020).

Diagnosis

Case was admitted to hospital on day 6 of illness. Chest X-ray revealed tiny patches of opacities and was reported as bronchopneumonia. Nasopharyngeal MutaPLEX coronavirus real-time RT-PCR for SARS Coronavirus 2 and other SARS-related Betacoronaviruses confirmed COVID-19 infection on day 6 of illness.

Treatment

Frequent salbutamol inhalers were administered in the hospital. No oxygen was required. Symbicort inhalers were given. Oral prednisolone was given in accident and emergency department which stopped the following day when COVID-19 was confirmed. Case improved and was discharged after 2 days. Case was not retested for COVID-19 prior to hospital discharge, but parents were notified and advised to self-isolate for 14 days and 8 days of child self-isolating as per the guidelines from Public Health Agency in our country.

Discussion

Symptoms of pandemic COVID-19 are generally milder in children than adults. [5–7] Pandemic COVID-19 may present with mild pneumonia in children. Although there is a paucity of literature on pediatric risk factors, the case series to date from Wuhan on hospitalized pediatric cases do not list asthma as a pre-existing risk factor for morbidity or mortality. [11] We presented a 12-year old girl with underlying asthma who presented with mild pneumonia secondary to COVID-19. We have demonstrated that children with underlying comorbidities such as asthma may be at a greater risk of COVID-19

similar to adults with other comorbidities [3]. Though there is minimal literature on the risk that COVID-19 could trigger a viral induced exacerbation of asthma in asthmatic children [11] and little is known about COVID-19 clinical presentations in children to date, we have demonstrated that COVID-19 may present with a clinical picture of asthma or asthma exacerbation in asthmatic children, with cough; wheeze, and breathing difficulties.

Nebulizers may increase the risk of disseminating COVID-19; therefore, our case was managed with inhalers (as per Global Initiative for Asthma (GINA) report released on 25 March 2020 on asthma management when COVID-19 is confirmed or suspected). Nebulizers may also increase the risks of viral lower lung deposition [11] and by stimulating cough reflex may increase risk of transmission to healthy contacts. [11]

Oral corticosteroids may prolong COVID-19 clearance, and their use in the management of asthma in children infected with COVID-19 was not recommended both by WHO and the Centers for Disease Control (CDC) in the USA. [11] Therefore, oral corticosteroids were discontinued once the diagnosis of COVID-19 was confirmed.

Additional observations of clinical presentations of COVID-19 in children are recommended.

Compliance with Ethical Standards

Competing Interests The authors declare that they have no competing interests.

Ethical Approval Ethical approval was obtained from the director of Northern Ireland Clinical Research Network-Western Health and Social Care Trust (WHSCT)

Informed Consent Consent was obtained from parents.

References

1. Team NCPERE. Vital surveillances: the epidemiological characteristics of an outbreak of 2019 novel coronavirus diseases (COVID-19) – China. *China CDC Weekly*. 2020;2(8):113–22.
2. Yang X, Yu Y, Xu J, Shu H, Xia J, Liu H, et al. Clinical course and outcomes of critically ill patients with SARS-CoV-2 pneumonia in Wuhan, China: a single-centered, retrospective, observational study. *Lancet Respir Med*. 2020. Epub 2020/02/28;8:475–81. [https://doi.org/10.1016/S2213-2600\(20\)30079-5](https://doi.org/10.1016/S2213-2600(20)30079-5).
3. Huang C, Wang Y, Li X, Ren L, Zhao J, Hu Y, et al. Clinical features of patients infected with 2019 novel coronavirus in Wuhan, China. *Lancet*. 2020;395(10223):497–506. [https://doi.org/10.1016/S0140-6736\(20\)30183-5](https://doi.org/10.1016/S0140-6736(20)30183-5).
4. Rhodes A, Evans LE, Alhazzani W, Levy MM, Antonelli M, Ferrer R, et al. Surviving Sepsis campaign: international guidelines for management of sepsis and septic shock: 2016. *Intensive Care Med*. 2017;43(3):304–77. <https://doi.org/10.1007/s00134-017-4683-6>.
5. Wei M, Yuan J, Liu Y, Fu T, Yu X, Zhang ZJ. Novel coronavirus infection in hospitalized infants under 1 year of age in China. *JAMA*. 2020;323:1313. <https://doi.org/10.1001/jama.2020.2131>.

6. Cai J, Xu J, Lin D, Yang Z, Xu L, Qu Z, et al. A case series of children with 2019 novel coronavirus infection: clinical and epidemiological features. *Clin Infect Dis*. 2020. <https://doi.org/10.1093/cid/ciaa198>.
7. Xia W, Shao J, Guo Y, Peng X, Li Z, Hu D. Clinical and CT features in pediatric patients with COVID-19 infection: different points from adults. *Pediatr Pulmonol*. 2020;55:1169–74. <https://doi.org/10.1002/ppul.24718>.
8. Zhou F, Yu T, Du R, Fan G, Liu Y, Liu Z, et al. Clinical course and risk factors for mortality of adult inpatients with COVID-19 in Wuhan, China: a retrospective study. *Lancet*. 2020. [https://doi.org/10.1016/S01406736\(20\)30566-3](https://doi.org/10.1016/S01406736(20)30566-3).
9. Park WB, Poon LLM, Choi SJ, Choe PG, Song KH, Bang JH, et al. Replicative virus shedding in the respiratory tract of patients with Middle East respiratory syndrome coronavirus infection. *Int J Infect Dis*. 2018;72:8–10. <https://doi.org/10.1016/j.ijid.2018.05.003>.
10. Abrams EM, Geert W’J, Yang CL. Asthma and COVID-19. *CMAJ*. 2020;cmaj.200617. <https://doi.org/10.1503/cmaj.200617>.
11. Abrams EM, Szeffler SJ. Managing asthma during COVID-19: an example for other chronic conditions in children and adolescents. *J Pediatr*. 2020;S0022–3476(20):30528–X. <https://doi.org/10.1016/j.jpeds.2020.04.049>.

Publisher’s Note Springer Nature remains neutral with regard to jurisdictional claims in published maps and institutional affiliations.