

Triple Therapy With Budesonide/glycopyrrolate/formoterol Fumarate Used in Asthmatic Coexisting With Covid-19

Yingjian Liang

Fifth Affiliated Hospital of Sun Yat-sen University

Meizhu Chen

Fifth Affiliated Hospital of Sun Yat-sen University

Cuiyan Tan

Fifth Affiliated Hospital of Sun Yat-sen University

Changli Tu

Fifth Affiliated Hospital of Sun Yat-sen University

Jin Huang

Fifth Affiliated Hospital of Sun Yat-sen University

Xiaobin Zheng

Fifth Affiliated Hospital of Sun Yat-sen University

Jing Liu (✉ liujing25@sysu.edu.cn)

Fifth Affiliated Hospital of Sun Yat-sen University

Case report

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Abstract

Background: Awareness of the association between coronavirus disease 2019 (COVID-19) and airway diseases can effectively help in the treatment during the coronavirus pandemic.

Case presentation: Herein, we present a COVID-19 case who confirmed to coexist with asthma. BGF was used as sequential medicine to systemic glucocorticoids for his persisted symptoms related to bronchospasms.

Conclusion: Our case suggests patients with long-term airway diseases like asthma probably attribute to COVID-19 instead of primary diseases, which make it more difficult in the treatment. BGF is able to be an effective and convenient choice as sequential medicine to systemic glucocorticoids in some refractory asthmatic patients complicated with COVID-19.

Background

Coronavirus disease 2019 (COVID-19) is caused by a newly notorious coronavirus (severe acute respiratory syndrome coronavirus-2, SARS-CoV-2) and is of great global public health concern as it spiraled into a pandemic. (1) Recently, there has been increasing interest in recognizing the association between COVID-19 and airway diseases including asthma. (2, 3) However, study about COVID-19 coexisting asthma, an airflow limitation disease was extremely scanty. Herein, we presented an asthma case coexisting with COVID-19.

Case Presentation

A 54-year-old Guinean man with 25-years smoking history (>250 pack years) was admitted to our hospital on March 17 2020 for 3 weeks' no-production cough and sneeze as well as 2 weeks' fever after his travel from COVID-19-ridden part of England and was quarantined as a COVID-19 suspected infection patient. Peripheral ground glass opacity (GGO) involved in bilateral multi-lobes was found in chest computed tomography (CT) scan (**Figure 1**) and he was confirmed as COVID-19 by real time polymerase chain reaction (RT-PCR) according to Chinese Center for Disease Control recommended methods. Oxygen support was given after a COVID-19 diagnosis. However, his oxygenation index descends and PaCO₂ ascends (≥50 mmHg) persisted even after high-flow nasal cannula (HFNC) and low-dose methylprednisolone therapy. He was transferred to ICU and received urgent intubation for invasive ventilation. However, deteriorated progression of his respiratory condition persisted. Due to the supplementary of long-term poor asthma as well as allergic rhinitis management history was provided from his family and obvious wheezing sound was caught, with a high level of total immunoglobulin E (301 IU/ml) in his blood, clear diagnosis of acute asthma attack had been identified. In consideration of acute asthma attack, a large-dose systemic glucocorticoids therapy (methylprednisolone 4 mg/kg·d) was used immediately. Respiratory condition improved gradually and invasive ventilation was ceased. However, symptoms including chest tight, dyspnea as well as wheezes still persisted in the course of systemic

glucocorticoids converting to inhaled corticosteroid (ICS)/long-acting β 2-agonist (LABA) combination with dry powder inhaler (DPI) because of his limited cooperation. Triple therapy with budesonide/glycopyrrolate/formoterol fumarate (BGF) with a novel pressure metered dose inhaler (pMDI) was used sequentially to prevent the adverse effect of long-term systematic glucocorticoids therapy. Our patient successfully started out-of-bed activities on day 26, with recovery lung image. **(Figure 1)**

Discussion And Conclusion

To our knowledge, it is the first report about the triple therapy with BGF, a combination of ICS, LABA and long-acting muscarinic antagonists (LAMA) with co-suspension delivery technology, used in asthma complicated with COVID-19. Although the occurrence ratio of COVID-19 in asthma were low, several reports have indicated that SARS-CoV-2 commonly trigger the acute attack of asthma. (2, 3) Our case is able to be a potentially reminder that asthma can increase the diagnosis and cure difficulty of COVID-19 probably. Two reasons maybe contribute to the diagnosis difficulty according to our clinical experience. Firstly, it is no easy to distinguish COVID-19 with airway diseases because of the same clinical features like cough, chest tightness, dyspnea. (4, 5) Another is the long-standing asthma patients commonly have poor perception of own symptoms, which make it hard to describe the exact degree of their obstruction in airway and probably attribute their symptoms to COVID-19.

Recently, triple therapy with BGF has been identified effective and convenient among ACO as it can result in an improvement in lung function through distinct and complementary mechanisms. (6) BGF might be a better choice as sequential medicine to systemic glucocorticoids in some refractory asthma patients. In present case, BGF help our patient relieve the burden of symptoms as well as daily activities, which greatly enhance the doctors' confidence of ICS as well as bronchodilators used in COVID-19 complicated with airway disease.

Abbreviations

budesonide/glycopyrrolate/formoterol fumarate, **BGF**; coronavirus disease 2019, **COVID-19**; computed tomography, **CT**; severe acute respiratory syndrome coronavirus-2, **SARS-CoV-2**; dry powder inhaler, **DPI**; ground glass opacity, **GGO**; high-flow nasal cannula, **HFNC**; glucocorticoids converting to inhaled corticosteroid, **ICS**; long-acting β 2-agonist, **LABA**; long-acting muscarinic antagonists, **LAMA**; pressure metered dose inhaler pMDI.

Declarations

Authors' contributions

YJ contributed to origin writing. MC, C. Tan and C. Tu responded to the clinical data collected. JH, XZ and JL contributed to the revision of the manuscript for important scientific content. All authors read and approved the final manuscript.

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Not applicable.

Competing interests

The authors declare that they have no competing interests.

Availability of data and materials

Not applicable.

Consent for publication

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Ethics approval and consent to participate

Written and informed consent was obtained from the patient to participate.

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Figures

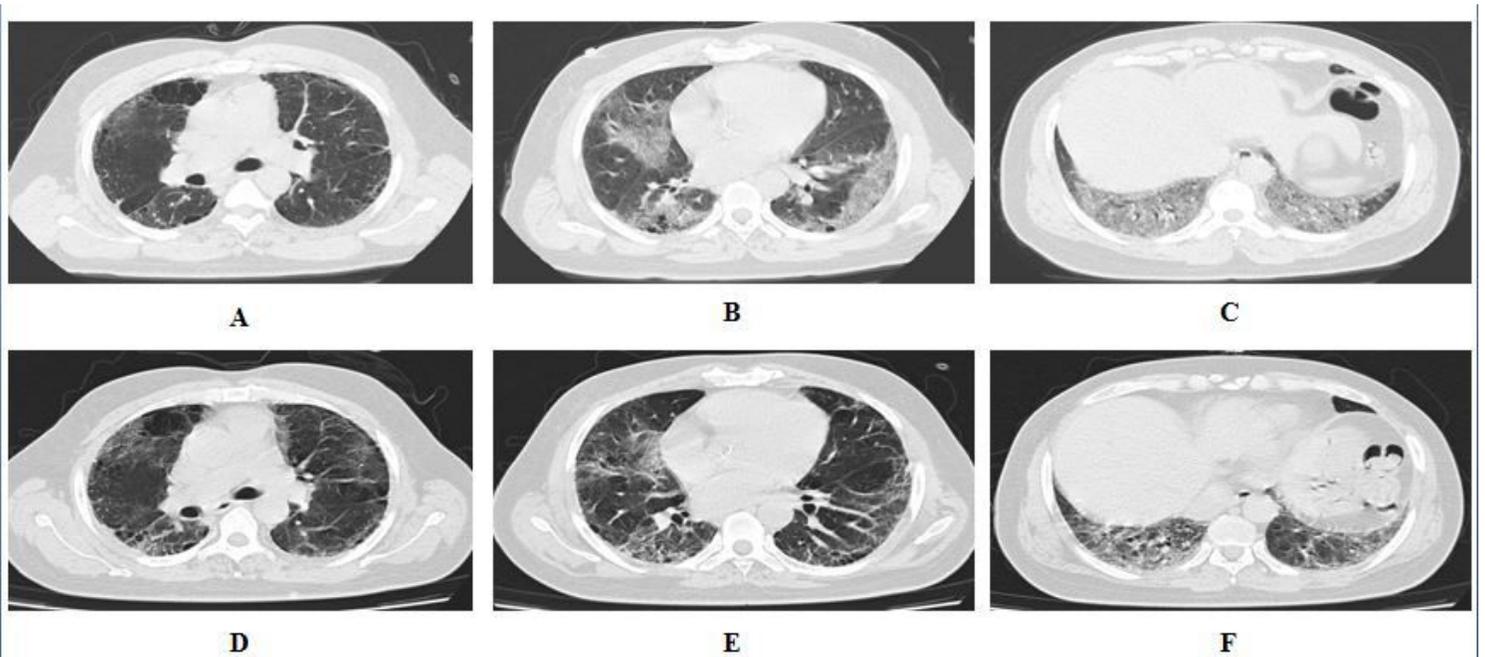


Figure 1

Evolution of CT scans. (A-C) represents lesions at admission. (D-F) demonstrates the recovery after out-of-bed activities.