

COVID-19 and Non Culturable Bacteria: A Plausible Association

Dear Editor,

Coronavirus disease 2019 (COVID-19) is a zoonotic infection caused by the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) with the extreme acute respiratory syndrome. Coronavirus is a zoonotic infection with a positive polarity RNA envelope that belongs to the *Coronaviridae* family. There are four recognized genera of coronavirus; however, on January 10, 2020, a new coronavirus arose in Wuhan, China, causing a serious pulmonary outbreak. SARS-CoV-2 appears to be the third highly deadly human coronavirus to develop in the recent two decades, following SARS coronavirus and Middle East Respiratory Syndrome coronavirus.^[1]

SARS-CoV-2 infection associated with a bacterial pathogen (combined viral and bacterial pneumonia) was described in COVID-19. Secondary bacterial pneumonia can develop after a viral respiratory illness has cleared up or during the healing period.^[2]

In fatal instances, bacterial infections are more prevalent than in recovered patients. If bacterial infections are the cause of death in COVID-19, this has significant implications for patient treatment.^[3]

The death rate for patients who acquired secondary infections was 56.7%, compared to 10.6% for all COVID-19 patients hospitalized. In 78% of the cases, Gram-negative bacteria were found. The most common pathogen was *Klebsiella pneumoniae* (29%), followed by *Acinetobacter baumannii* (21%), *Pseudomonas aeruginosa* (9.6%), and *Escherichia coli* (8.2%). Methicillin-resistant *Staphylococcus aureus* was isolated only in 1.29%. High levels of carbapenem resistance were seen in *A. baumannii* (92.6%) followed by *K. pneumoniae* (72.8%).^[4]

According to recent research, bacterial co-infection occurred in 3.1%–3.5% of COVID-19 patients at admission, with subsequent bacterial infections occurring in up to 15% of patients following hospitalization.^[5]

Atypical organisms linked to COVID-19 are organisms that are difficult to grow and do not show up on a gram stain. Because antibiotics must be able to enter intracellularly to reach their intended target, they are difficult to separate and treat due to their intracellular nature. Because atypical organisms lack cell walls, such as *M. pneumoniae*, the most prevalent, beta-lactam antibiotics are not indicated. Antibiotic resistance,

poor compliance, and an inability to take oral medicines are all factors that contribute to treatment failure. Furthermore, some individuals may have obstructive lung lesions or a misdiagnosis.

Atypical pneumonia can be contracted from a variety of causes. *Mycoplasma pneumoniae*, which is associated with close living conditions such as at school and military barracks, *Legionella spp.* from stagnant water sources, *Chlamydia pneumoniae*, *Coxiella burnetii*, and *Francisella tularensis* from various mammalian sources are among the most commonly identified atypical pathogens.^[6] As well as, other pathogens that can be associated with COVID-19.^[7-9]

Secondary infections in COVID-19 patients have been linked to poor health outcomes. Nonculturable bacteria have been associated with death in COVID-19 patients, and they may require a specific antibiotic to preserve the patient's life. More research is needed to validate this issue, as there is currently little evidence available.

Financial support and sponsorship

None.

Conflicts of interest

There are no conflicts of interest.

Falah Hasan Obayes Al-Khikani, Muayad Mahdi Kadim

Department of Microbiology, Al-Shomali General Hospital, Babil, Iraq

Address for correspondence: Dr. Falah Hasan Obayes Al-Khikani,
Department of Microbiology, Al-Shomali General Hospital, Babil, Iraq.
E-mail: falahgh38@gmail.com

REFERENCES

1. Al-Khikani FH. Amphotericin B as antiviral drug: Possible efficacy against COVID-19. *Ann Thorac Med* 2020;15:118-24.
2. Wu CP, Adhi F, Highland K. Recognition and management of respiratory coinfection and secondary bacterial pneumonia in patients with COVID-19: Posted April 27, 2020. *Cleve Clin J Med* 2020;5:87.
3. Farrell JM, Zhao CY, Tarquinio KM, Brown SP. Causes and consequences of COVID-19-associated bacterial infections. *Front Microbiol* 2021;12:61-66.
4. Vijay S, Bansal N, Rao BK, Veeraraghavan B, Rodrigues C, Wattal C, et al. Secondary infections in hospitalized COVID-19 patients: Indian experience. *Infect Drug Resist* 2021;14:1893-903.
5. Garcia-Vidal C, Sanjuan G, Moreno-García E, Puerta-Alcalde P, Garcia-Pouton N, Chumbita M, et al. Incidence of co-infections and super infections in hospitalized patients with COVID-19: A retrospective


Letter to the Editor

cohort study. Clin Microbiol Infect 2021;27:83-8.

6. Wagner K, Springer B, Imkamp F, Opota O, Greub G, Keller PM. Detection of respiratory bacterial pathogens causing atypical pneumonia by multiplex Lightmix® RT-PCR. Int J Med Microbiol 2018;308:317-23.
7. Falah AK, Hameed R. COVID-19 treatment: Possible role of itraconazole as new therapeutic option. Int J of Health and Allied Sci 2020;9:101-04.
8. Al-Khikani FH. Mucormycosis “Black Fungus” new challenge associated with COVID 19. Biomedical and Biotechnology Research Journal (BBRJ) 2021;5:267.
9. Al-Khikani FH, Almosawey HA, Abdullah YJ, Al-Asadi AA, Hameed RM, Hasan NF, *et al.* Potential antiviral properties of antifungal drugs. Journal of the Egyptian Women’s Dermatologic Society 2020;17:185.

This is an open access journal, and articles are distributed under the terms of the Creative Commons Attribution-NonCommercial-ShareAlike 4.0 License, which allows others to remix, tweak, and build upon the work non-commercially, as long as appropriate credit is given and the new creations are licensed under the identical terms.

Submitted: 25-Aug-2021 Accepted: 30-Aug-2021 Published: 23-Oct-2021

Access this article online	
Quick Response Code: 	Website: www.ijms.in
	DOI: 10.4103/injms.injms_98_21

How to cite this article: Al-Khikani FH, Kadim MM. COVID-19 and non culturable bacteria: A plausible association. Indian J Med Spec 2021;12:239-40.

© 2021 Indian Journal of Medical Specialities | Published by Wolters Kluwer - Medknow