AFGHANISTAN JOURNAL OF INFECTIOUS DISEASES

GHALIB UNIVERSITY

AJID

https://ajid.ghalib.edu.af/index.php/ajid

OPEN ACCESS

Vol. 1, No. 1, January 2023, pp.39-40

COVID 19-associated fungal infections: An overview

letters to the Editor

DOI: https://doi.org/10.58342/ajid/ghalibUni2

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To cite this article: Shams-Ghahfarokhi M, Razzaghi-Abyaneh M. COVID 19-associated fungal infections: An overview. Afghanistan journal of infectious diseases. 2023 Jan; 1 (1): 39-40. https://doi.org/10.58342/ajid/ghalibUni2

The pandemic of COVID-19 caused by SARS-CoV-2 has accounted to infect over 36.5 million individuals and claimed over one million lives worldwide, since October 2020. The newly developed etiologic virus was rapidly spreading across China and expanded to involve 213 countries/territories worldwide [1, 2]. COVID-19 has shown to increases the risk for fungal infections due to its adverse effect on the immune system. This can complicate clinical manifestations, induces treatment failures, and meaningfully increases the total mortality [3]. Aspergillosis, invasive candidiasis, and mucormycosis has been reported as the most common fungal infections in patients with COVID-19, while other infections such as cryptococcosis, pneumocystosis pneumonia, coccidioidomycosis, paracoccidioidomycosis, and histoplasmosis have also been disclosed [4, 5].

According to the results of studies conducted worldwide, the main question raised is: “Can fungi underlie to aggravate COVID-19?” Or, conversely, “Can COVID-19 affect the susceptibility to fungal infections, similar to the proven role of the influenza virus?” Aspergillus species are responsible for various pulmonary infections including invasive pulmonary aspergillosis (IPA), chronic pulmonary aspergillosis (CPA), allergic bronchopulmonary aspergillosis (ABPA), chronic rhinosinusitis, fungal asthma, and Aspergillus bronchitis with a fatal consequence if these diseases misdiagnosed or late diagnosed [6]. The cases of pulmonary aspergillosis associated with COVID-19 (CAPA) have been reported by many researchers since August 2020 [6]. Similar to influenza-associated pulmonary aspergillosis, CAPA develops few days following ICU admission. The establishment of pulmonary aspergillosis super-infection in COVID-19 and influenza patients follows exposure to common risk factors [8].

COVID-19-associated mucormycosis cases have also been seen reported from India, the United States,

and other parts of the world with uncontrolled diabetes and overuse of steroids for COVID-19 treatment as the major risk factors. Vaccination against COVID-19, use of steroids for COVID-19 treatment based on guideline, and controlling the blood sugar of patients with diabetes who have COVID-19 can significantly reduce the risk of COVID-19-associated mucormycosis [9, 10]. Early diagnosis and treatment are key to improving outcomes for such patients.

The outbreaks of Candida auris have been reported in patients with COVID-19 infection [11]. The fungus is an emerging pathogen responsible for outbreaks of severe infections in healthcare facilities. In the United States, it has most commonly been reported in long-term care facilities caring for people with severe medical conditions. These outbreaks may be a consequence of limited availability of gloves and gowns, reuse or extended use of these items, and insufficient cleaning and disinfection practices.

Patients hospitalized for COVID-19 are at risk for healthcare-associated infections (HAIs), including candidemia, or bloodstream infections caused by Candida [12]. These patients mainly have acute risk factors linked to COVID-19 care, including medicines that suppress the immune system.

It has been reported that other less common fungal infections, such as coccidioidomycosis, histoplasmosis, and blastomycosis, can cause fever, cough, and shortness of breath, similar to COVID-19 and bacterial pneumonias [13]. People become infected by breathing the etiologic fungi mainly found in soil as the main reservoir. Clinicians should aware about fungal pneumonias as a possible cause of respiratory illness, particularly if COVID-19 testing is negative. It is important to note that these fungal diseases can occur at the same time as COVID-19.

Overall, it is important to consider the occurrence of fungal co-infections among patients with severe COVID-19 disease, in terms of nosocomial fungal infections, especially those admitted to intensive care units and might require a long hospital practice. The high mortality of COVID-19 patients with fungal co-infections, despite antifungal therapy, indicates the severity of the disease in these patients and reinforce the importance of rapid diagnosis and timely initiation of antifungal treatment.

Acknowledgments

This work was financially supported by the Research Deputy of Tarbiat Modares University.

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