Related Links

Fungal Meningitis

National Center for Emerging and Zoonotic Infectious Disease

Division of Foodborne, Waterborne, and Environmental Diseases

Mycotic Diseases Branch

Fungal Diseases and COVID-19

Overview

Symptoms of some fungal diseases can be similar to those of COVID-19, including fever, cough, and shortness of breath.[1] Laboratory testing is necessary to determine if a person has a fungal infection or COVID-19. Some patients can have COVID-19 and a fungal infection at the same time.

People with severe COVID-19, such as those in an intensive care unit (ICU), are particularly vulnerable to bacterial and fungal infections. The most common fungal infections in patients with COVID-19 include aspergillosis or invasive candidiasis.[1-5] These fungal co-infections are reported with increasing frequency and can be associated with severe illness and death.[1,3,4,7,9] Awareness of the possibility of fungal co-infection is essential to reduce delays in diagnosis and treatment in order to help prevent severe illness and death from these infections.

COVID-19-associated pulmonary aspergillosis

Scientists are still learning about aspergillosis (infections caused by the fungus *Aspergillus*) in people with severe COVID-19. In the past, scientists thought aspergillosis occurred almost entirely in people with severely weakened immune systems. However, aspergillosis has been increasingly reported in patients without weakened immune systems but who have severe respiratory infections caused by viruses, including influenza. Several recent reports describe COVID-19-associated pulmonary aspergillosis (CAPA).[1,3,6,9,10-13]

Available information indicates that CAPA:

- usually occurs in patients with severe COVID-19 (e.g., patients on ventilators in ICUs)[1,4,11-13]
- can be difficult to diagnose because patients often have non-specific symptoms and testing typically requires a specimen from deep in the lungs[11]
- can cause severe illness and death[6,9,11-13]

Clinicians should consider the possibility of aspergillosis in patients with severe COVID-19 who have worsening respiratory function or sepsis, even if they do not have classical risk factors for aspergillosis.[15] Testing for CAPA usually involves obtaining specimens from patients' lower respiratory tract, which are tested for *Aspergillus* galactomannan antigen and fungal culture.

Increased spread of *Candida auris* during COVID-19 pandemic

Candida auris is an emerging fungus that can cause outbreaks of severe infections in healthcare facilities. In the United States, it has most commonly spread in long-term care facilities caring for people with severe medical conditions. However, since the start of the COVID-19 pandemic, outbreaks of *C. auris* have been reported in COVID-19 units of acute care hospitals. These outbreaks may be related to changes in routine infection control practices during the COVID-19 pandemic, including limited availability of gloves and gowns, or reuse of these items, and changes in cleaning and disinfection practices. New *C. auris* cases without links to known cases or healthcare abroad have been identified recently in multiple states, suggesting an increase in undetected transmission. Screening for *C. auris* colonization, an important part of containment efforts, has been more limited as resources of healthcare facilities and health departments have been diverted to respond to COVID-19.

Invasive candidiasis in patients with COVID-19

Patients hospitalized for COVID-19 are at risk for healthcare-associated infections (HAIs), including candidemia, or bloodstream infections caused by *Candida*.[7,16-18] Fungal infections resistant to antifungal treatment have also been described in patients with severe COVID-19.[18,19] Early diagnosis and monitoring for *Candida* infections and antifungal resistant infections (e.g., *C. auris*, azole-resistant *Aspergillus*) are key to reducing death from COVID-19 in patients with severe COVID-19 fungal co-infections.

Fungal pneumonias can resemble COVID-19

Other fungal diseases, such as Valley fever (coccidioidomycosis), histoplasmosis, and blastomycosis, can cause fever, cough, and shortness of breath, similar to COVID-19 and bacterial pneumonias.[20] These fungi live in soil. People become infected by breathing in fungi present in the air. Clinicians should consider 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.[21,22]

Learn more about Valley fever, histoplasmosis, and blastomycosis.

Related Links

- CDC: COVID-19
- CDC: Aspergillosis
- CDC: *Candida auris*
- CDC: Histoplasmosis
- CDC: Blastomycosis
- CDC: Coccidioidomycosis

References

1. Hoenigl M. Invasive fungal disease complicating COVID-19: when it rains it pours . Clin Infect Dis. 2020 Sep 5
2. Garcia-Vidal C, Sanjuan G, Moreno-García E, et al. Incidence of co-infections and superinfections in hospitalized patients with COVID-19: a retrospective cohort study . Clin Microbiol Infect. 2020 Jul 31
3. Lansbury L, Lim B, Baskaran V, Lim WS. Co-infections in people with COVID-19: a systematic review and meta-analysis . J Infect. 2020 May 27
4. Gangneux JP, Bougnoux ME, Dannaoui E, Cornet M, Zahar JR. Invasive fungal diseases during COVID-19: We should be prepared . J Mycol Med 2020 Jun
5. Song G, Liang G, Liu W. Fungal Co-infections Associated with Global COVID-19 Pandemic: A Clinical and Diagnostic Perspective from China . Mycopathologia. 2020 Jul 31
6. Koehler P, Cornely OA, Böttiger BW, Dusse F, Eichenauer DA, Fuchs F, et al. COVID-19 associated pulmonary aspergillosis . Mycoses. 2020 May 15
7. Chen N, Zhou M, Dong X, Qu J, Gong F, Han Y, et al. Epidemiological and clinical characteristics of 99 cases of 2019 novel coronavirus pneumonia in Wuhan, China: a descriptive study . Lancet. 2020 Jan 30
8. Beer KD, Jackson BR, Chiller T, Verweij PE, Van de Veerdonk FL, Wauters J, Does pulmonary aspergillosis complicate COVID-19? Crit Care Exp. 2020 Sep 18
9. Mohamed A, Rogers TR, Talento AF. COVID-19 associated invasive pulmonary aspergillosis: diagnostic and therapeutic challenges . J Fungi. 2020 Jul 22
10. Verweij PE, Gangneux J, Bassetti M, Bruggemann RJM, Cornely OA, Koehler P, et al. Diagnosing COVID-19-associated pulmonary aspergillosis . Lancet Microbe. 2020 May 10
11. Koehler P, Bassetti M, Chakrabarti A, Chen SCA, Colombo AL, Hoenigl M, et al. Defining and managing COVID-19-associated pulmonary aspergillosis: the 2020 ECMM/ISHAM consensus criteria for research and clinical guidance . Lancet. 2020 Dec 14
12. Dellière S, Dudoignon E, Fodil S, Voicu S, Collet M, Oillic P, et al. Risk factors associated with Covid-19-associated pulmonary aspergillosis in ICU patients: a French multicentric retrospective cohort . Clin Microbiol Infect. 2020 Dec 13
13. Marr KA, Platt A, Tornheim JA, Zhang SX, Datta K, Cardozo C, et al. Aspergillosis complicating severe coronavirus disease. Emerg Infect Dis. 2021 Jan
14. Arastehfar A, Carvalho A, van de Veerdonk, FL, Jenks JD, Koelher P, Krause R, et al. COVID-19 associated pulmonary aspergillosis (CAPA) – from immunology to treatment . 2020 Jun 24
15. CDC: Information for Healthcare Professionals About Aspergillosis
16. Nucci M, Barreiros G, Guimarães LF, Deriquehem VA, Castiñeiras AC, Nouér SA. Increased incidence of candidemia in a tertiary care hospital with the COVID-19 pandemic . Mycoses. 2020 Dec 4
17. Hughes S, Troise O, Mughal N, Moorse LSP. Bacterial and fungal coinfection among hospitalized patients with COVID-19: a retrospective cohort study in a UK secondary-care setting . Clin Microbiol Infect. 2020 Jun 27
18. Posteraro B, Torelli R, Vella A, Leone PM, De Angelis G, De Carolis E, et al. Pan-echinocandin-resistant *Candida glabrata* bloodstream infection complicating COVID-19: a fatal case report . J Fungi. 2020 Sep 6
19. Meijer EFJ, Dofferhoff ASM, Hoiting O, Buil JB, Meis JF. Azole-resistant COVID-19-associated pulmonary aspergillosis in an immunocompetent host: a case report . J Fungi. 2020 Jun 6
20. Benedict K, Kobayashi M, Garg S, Chiller T, Jackson BR. Symptoms in blastomycosis, coccidioidomycosis, and histoplasmosis versus other respiratory illnesses in commercially insured adult outpatients, United States, 2016–2017 . Clin Infect Dis. 2020 Oct 16
21. Shah AS, Heidari A, Civelli VF, Sharma R, Clark CS, Munoz AD, et al. The coincidence of 2 epidemics, coccidioidomycosis and SARS-CoV-2: a case report . J Investig Med High Impact Case Rep. 2020 Jun 4
22. Bertolini M, Mutti MF, Barletta JA, et al. COVID-19 associated with AIDS-related disseminated histoplasmosis: a case report . Int J STD AIDS. 2020 Sep 9

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