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Short Communication

The lurking scourge of multidrug resistant *Candida auris* in times of COVID-19 pandemicAnuradha Chowdhary^{a,*}, Amit Sharma^b^a Department of Medical Mycology, Vallabhbai Patel Chest Institute, University of Delhi, Delhi 110007, India^b Molecular Medicine Group, International Centre For Genetic Engineering and Biotechnology, Aruna Asaf Ali Road, New Delhi 110067, India

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The emergence of severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) in late 2019 has caused a pandemic of COVID-19. A particularly disturbing feature of COVID-19 patients is their tendency to develop acute respiratory distress syndrome that requires ICU admission, mechanical ventilation and/or extracorporeal membrane oxygenation [1]. Reports from several countries suggest flooding of hospital ICUs by COVID-19 patients that require respiratory support ranging from high-flow nasal cannula to invasive ventilation. This haunting facet of COVID-19 pandemic has severely challenged even the most advanced hospital settings. Yet one potential confounder, not in the immediate attention of most healthcare professionals, is the secondary transmission of multidrug resistant organisms like the fungus *Candida auris* in COVID-19 ICUs [2]. Before the arrival of SARS-CoV-2, *C. auris* was considered a major global health threat due to high rates of drug resistance and ease of transmission in hospital settings. Indeed, multidrug resistant *C. auris* has been reported from over 40 countries across six continents since its first description a decade ago. Given the nosocomial transmission of SARS-CoV-2 by those infected, many hospital environments may serve as venues for *C. auris* transmission as it is a known environmental colonizer of ICUs. *C. auris* patients shed viable yeast cells from their skin continuously and thereby contaminate hospital environments. *C. auris* outbreaks occur in critically ill hospitalized patients and can result in mortalities rates ranging from 30% to 72% [3]. Both *C. auris* and SARS-CoV-2 have been found on hospital surfaces including on

bedrails, IV poles, beds, air conditioner ducts, windows and hospital floors [4,5]. Therefore, the standard COVID-19 critical care of mechanical ventilation and protracted ventilator-assisted management makes these patients potentially susceptible to colonization and infections by *C. auris*.

Candida auris can be transmitted in healthcare settings just like other multidrug-resistant organisms such as carbapenem-resistant Enterobacteriaceae and methicillin-resistant *Staphylococcus aureus* (MRSA). Although, personal protective equipment significantly reduces transmission of pathogens by healthcare workers, however, despite upgraded infection control measures significant increase in the rate of MRSA acquisition amongst SARS patients during its outbreak has been recorded [6]. The transmission of MRSA was probably attributed to low compliance to the guideline of changing gloves and cleaning hands before and after each contact with a patient resulting not only in cross-transmission of MRSA between patients but also in heavy contamination of the ICU environment [6]. The global burden of COVID-19 will likely fall hardest on the under-resourced public health systems of developing countries that are inadequately prepared for this pandemic. Their ICU teams will need to face the challenge of over-occupancy of beds and compromised infection prevention control practices [7]. *C. auris* may thrive and spread in such conditions. Further, relaxation of measures, such as screening of patients for *C. auris* colonization and subsequent cohorting during the pandemic due to higher workload of healthcare workers, may potentially lead to a greater number of hospital transmissions. COVID-19 patients who are pre-colonized with *C. auris* and require indwelling catheters such as central venous and foley catheters have higher risks of the development of *C. auris* blood stream and urinary tract

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infections respectively in ICU settings [8]. It is important to emphasize that patients hospitalized in ICU for COVID-19 tend to share risk factors, medications and underlying co-morbidities with *C. auris* infections like diabetes mellitus, chronic kidney disease, intubation/mechanical ventilation, administration of broad spectrum antibiotics and systemic steroids.

As *C. auris* diagnostics in resource-limited countries is yet another challenge, we feel that alerting the global medical community about the potential of *C. auris* as a confounding factor in COVID-19 is a necessity. In addition, the overall burden of healthcare-associated infections of candidemia has been reported to be higher in low- and middle-income countries than in higher-income countries, possibly due to inadequate resources for infection prevention and control. As significant resources are required to identify SARS-CoV-2 infection and then to treat COVID-19 patients, it is feasible that diagnosis of other pathogens like *C. auris* may be ignored. The Centres for Disease Control and Prevention (CDC), USA, recommend strict isolation of patients who are either colonized or treated for *C. auris*. How CDC's guidelines can be implemented in the era of COVID-19, when medical facilities are overburdened and severely distracted with SARS-CoV-2, remains to be seen. Indeed, the ongoing COVID-19 pandemic may provide ideal conditions for outbreaks of *C. auris* in hospital ICUs. This fear is borne out by the reported fraction of ~4% fungal pathogen co-infections in a cohort of 99 COVID-19 cases in Wuhan Jinyintan Hospital [1]. Transmission of *C. auris* is concerning because of its high rates of antifungal resistance to fluconazole and to other antifungal agents. Multidrug-resistant *C. auris* isolates that are resistant to the three main classes of antifungals have been described in India and Kenya [9,10]. A study from India had suggested that *C. auris* accounted for 5% of candidemia cases in a paediatric hospital, and for 30% of cases in a tertiary general hospital from its intensive care unit [11]. It is vital that developing countries with high burden of *C. auris* identify and contain its outbreak in COVID-19 patients. The limited diagnostic capabilities in developing countries may result in under-recognition of fungal co-infections in COVID-19 patients. Indeed, COVID-19 patient mortality may already have contributions from *C. auris* or other co-infections. Thus, vigilance on *C. auris* in times of SARS-CoV-2 is warranted worldwide.

Contributors

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Conflicts of interests

The authors declare no competing interests.

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