Response to Commentary: Fungal Infections of Oral Cavity: Diagnosis, Management, and Association with COVID-19

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Abstract

This letter is a response to commentary by Ambadasu et al. on a review article by Santosh et al. on “Fungal Infections of Oral Cavity: Diagnosis, Management, and Association with COVID-19.” In their commentary, Ambadasu et al. mentioned that in the list of COVID-19 associated fungal infections, mucormycosis should be added. In this response, we provide our thoughts on including mucormycosis in COVID-19 associated fungal infections of the oral cavity. We conclude that mucormycosis surge was more prevalent during the second wave of COVID-19 infection. Majority of published reports on oral fungal infections during the years 2019 and 2020 was focused on Oral Candidiasis, whereas mucormycosis appears to be re-emerging opportunistic entry of fungal infection among COVID-19 infection due to associated risk factors. Thus, Physicians and Dentists must be cautioned that other listed opportunistic fungal infections of oral cavity may also be seen among severe COVID-19 patients. be seen among severe COVID-19 patients.

Keywords Oral cavity · Corona virus · COVID-19 · Mucormycosis · Candidiasis

Response to Commentary:

We thank Ambadasu et al. 2021 for their commentary feedback on our article. Mucormycosis is a growing concern in COVID-19 pandemic situation, especially in India [1]. The fear of the COVID-19 is now double folded due to re-emerging mucormycosis. Mucormycosis is a concern of emergency due to aspects such as associated risk factors, cost of treating mucormycosis, scarcity of mucormycosis related medications, sudden raise in the need for specialist or surgeons to provide immediate multidisciplinary surgical attention, and above everything mortality rate associated with mucormycosis. Due to various types of organ involvement in the mucormycosis conditions, i.e., pulmonary, cutaneous gastrointestinal, rhinocerebral, and

central nervous system and dissemination, there is a raising need for multidisciplinary surgical manpower in hospitals. Hence, healthcare settings may also find challenging to treat the mucormycosis and serves as burden to hospitals and society. Thus, mucormycosis is certainly an important co-morbid condition to be listed as associated oral fungal infections in COVID-19 infection [2].

The shift of managing mucormycosis should also be focused on prevention by understanding the associated risk factors. The risk factors associated with development of mucormycosis include the following: diabetes mellitus, broad spectrum antibiotics, neutropenia, elevated iron levels in circulatory blood, organ transplant, stem cell transplant, intravenous drug abuse, steroid usage, hematological malignancies, renal insufficiency, voriconazole usage, trauma, and burns [3]. Understanding the risk factors will pave the way for healthcare physicians on proper management strategy for COVID-19 infections for identifying vulnerable populations. A special attention should be on the newly diagnosed COVID 19 patients for screening and preventing mucormycosis. These preventive strategies may include cautioned use of steroids and antibiotics in COVID-19 medications [1]. In addition, a strong healthcare policy or public awareness should be made to prevent the intake of non-prescription antibiotics (self-medication).

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Opportunistic infection is a pathological condition caused due to microbial origin or poor/weakened immune system. The altered host immune system may turn indigenous microbiota as pathogenic to cause opportunistic infections. Opportunistic infections are known to cause increased patient care costs, morbidity and/or mortality. Oral cavity serves as a room for various microorganisms (bacteria, viral, fungal, and parasitic). Hence, during an opportunistic stage of the host immune system, the opportunistic infections may originate from the resident bacteria, virus, fungal, or parasitic infections. Thus, opportunistic infection will turn into co-morbid conditions in patients who have low or poor host immune systems. The opportunistic fungal infections of oral cavity include the following: aspergiollosis, blastomycosis, coccidiomycosis, cryptococcosis, histoplasmosis, mucormycosis, paracoccidioidomycosis, penicilliosis, phycomycosis, and sporotrichosis [4]. Considering the fact on incidence of mucormycosis as an opportunistic infection in COVID-19 patients' physicians and dentist must be cautioned that other listed opportunistic fungal infections may also be seen among severe COVID-19 patients. Similarly, opportunistic bacterial, viral, or parasitic oral infection may also be re-emerged in COVID-19 patients. Discussing the bacterial, viral, or parasitic opportunistic infections of oral cavity is out of the scope of this commentary which aimed to focus on fungal infections associated in COVID-19 patients.

To conclude, oral mucormycosis is re-emerging among COVID 19 infection as an opportunistic pathogenic play. Physicians, surgeons, and dentists must be alerted that re-emergence of any type of opportunistic infection of oral cavity may be anticipated in this pandemic situation. Our continued learning and understanding on risk factors associated with opportunistic infections of the oral cavity and by extension to the human body will assist healthcare settings to create awareness and prevent them with appropriate healthcare policies. During our review writing on "Fungal Infections of Oral Cavity: Diagnosis, Management, and Association with COVID-19," we have not listed mucormycosis in the associated fungal infections due to the fact that oral mucormycosis were not prevalently reported in the literature. This serves as a good example to state that the healthcare setting and

practitioners are still in the learning process of COVID-19 associated pathologies and the broader picture will be understood slowly as we recover from this pandemic.

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Declarations

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Informed Consent Not applicable.

Conflict of Interest The authors declare no competing interests.

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