

A Pandemic Leading to an Epidemic: Mucor Crisis during COVID-19

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Mucoromycetes (commonly known now as black fungus) under usual conditions are harmless fungi that are present in the environment but known to cause dreadful infection in immunocompromised patients especially those with uncontrolled diabetes. It is characterized by the fungal hyphae invasion into blood vessels, resulting in infarction and necrosis of host tissue. Historically, even with appropriate treatment, rhino-orbital cerebral infection has a mortality risk of ~ 50%. There was a considerable surge in this deadly disease during the COVID 19 epidemic. According to published research, India has reported 45,432 cases of mucormycosis as of July 15th 2021 and is responsible for over 71% of global instances of mucormycosis in COVID-19 individuals [1]. Fewer cases have been reported in other countries like Pakistan, Bangladesh, Nepal, Oman. There was an increase in fungal infection in developed countries as well during this pandemic, although it was *Aspergillus* and invasive candidiasis.

A perfect interplay of agent-host-environment precipitated the mucormycosis epidemic in India. Mucor is 70 - 80 times more common in India than in other countries (0.14 per 1000 population). The high prevalence of poorly controlled diabetes, which is the primary risk factor for mucor, combined with COVID 19-induced severe hypoxemia and steroid-induced immunosuppression made the patients an ideal host. Dense population, less stringent hygienic practices, repurposing masks, other PPE, equipment's like oxygen cylinders/tubings could have contributed.

The majority of COVID-19 associated mucormycosis patients are males, mean age group of 50 - 55, who require critical care unit admission and are on ventilators. According to multicenter studies, 87 - 100 percent of participants were on steroids for COVID-19, and diabetes was an underlying comorbidity in 78 - 85 percent of the cases [2-4]. The presentation is similar to those seen in non-COVID patients and mostly involves the rhino-orbital region. Mucormycosis is a medical emergency; prompt diagnosis and appropriate treatment with antifungal Amphotericin B should be initiated. Furthermore, the alternative treatment (posaconazole/isavuconazole) was not available in India, and many people could not afford the less toxic liposomal amphotericin. The overall mortality during this time is reported anywhere from 30 - 50%. Early surgical referral, aggressive surgical debridement of the paranasal sinus, and orbital exenteration are critical for a positive outcome. Adjunctive surgical intervention has been proved to significantly reduce mortality.

Even if a randomized controlled trial shows that steroids reduce mortality in COVID 19 patients, they should be used with caution. A 20-fold increase in mucor cases during this pandemic should serve as a wake-up call for judicious, controlled medication prescribing.

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