



## Editorial Review Article

# Mucormycosis Causes and Management of Infection- A Review

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## Abstract

Mucormycosis is a disease caused by fungal infection. Its prime target are those persons who are on medication and have reduced immunity to protect their body from secondary infections. Person having lungs infection easily get affected with mucormycosis. Infection occurs through inhalation of spores from air. Recently during COVID-19 in 2019-2022 increasing cases of mucormycosis were observed in survivors. About 45,432 cases of which 4,252 have died have been reported up to 15 July 2021 by states and union territories of India. There are methods for the diagnosis and management of the mucormycosis. Symptoms of Mucormycosis includes redness around eyes and/or nose, pain, fever, coughing headache, shortness of breath, bloody vomits and altered mental status.

**Keywords:** COVID-19, Mucormycosis, Diagnosis, Prophylaxis and treatment

## 1. Introduction

Mucormycosis is caused by eukaryotic microorganism, known as fungi. The disease can affect person of different age groups resulting in emergency [1]. It is caused by mucoralean fungi previously termed as zygomycosis [2], which is also known as Mucormycetes [3, 4]. However, Mucorales is the name of the order that is preferably used. Disease mainly affects those people with reduced immune system, having diabetes and penetrating trauma [5]. *Rhizopus*, *Mucor*, *Lichtheimia* *Rhizomucor*, *Apophysomyces* and *Saksenaeca* are major genera leading to mucormycoses [6]. Healthy person has also reported Mucormycosis in India and China including renal mucormycosis and chronic sub-cutaneous infections [7-8].

Histologically proven case of mycosis was first reported in Austria by Arnold Paltauf in at the University of Graz [9]. Epidemiology of the disease was not well defined for a long time. In France mucormycosis has been diagnosed increasingly during past years, with incidence of 1.2 per million/year in a general population [10]. Mortality rates in patients with mucormycosis remain high about 24% to 49% [11,12].

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## 1. Post COVID-19 Mucormycosis

Mucormycosis also known as black fungus was reported from almost every part of the country resulting in panic for general public with several hundreds of cases during COVID-19 [13]. The estimated prevalence has been reported about seventy (70) times high in India high that of global data according to epidemiology of mucormycosis 2021 [14]. Based on site of infection, mucormycosis can be classified in to pulmonary, rhino-orbito-cerebral (ROCM), gastrointestinal, cutaneous, renal, disseminated and other miscellaneous forms, including bones, urinary bladder and lymph nodes heart, ear and parotid gland [15,16].

In India many hospitals have reported mucormycosis cases leading to deaths among post COVID-19 cases. In the second wave of SARS-CoV-2 pandemic in India no of mucormycosis have increased drastically, nearly 2-5 cases are being reported daily. Several patients lost their vision due to mucormycosis in second wave of coronavirus. Proper number of post-COVID-19 mucormycosis cases yet not published officially. Up to May 2021 number of cases reported in various media has been summarized in figure-1 [17].

About 45,432 cases have been reported up to 15 July 2021 by states and UTs, of which 4,252 have died while 21,085 were receiving treatment [18]. Uncontrolled diabetes mellitus was a major risk factor for mucormycotic cases during COVID-19 [19]. In a systemic review and meta-analysis of 851 cases reports published in 2018, 389/851 (46%) deaths were reported [20].

## 2. Diagnosis of mucormycosis

Proper diagnosis of any disease is important for the proper treatment of the disease. Diagnosis should be started before the use of antibiotic therapy. To distinguish between mucormycosis, aspergillosis and bacterial infection is very important. For diagnosis of mucormycosis biopsy specimens are collected from infected sites [21].

Direct microscopy of specimens collected aseptically, permits rapid presumptive diagnosis of mucormycosis [22]. Hyphae having variable width from 6-25  $\mu\text{m}$  aseptate or pauci-septate and have an irregular, ribbon-like appearance with variable branching. Cultivation of specimens on solid media at 37°C is essential for proper identification of causal organism. Antibiotic susceptibility testing is also performed to see the effectiveness. Tissue specimens is also collected for Histopathological examination.

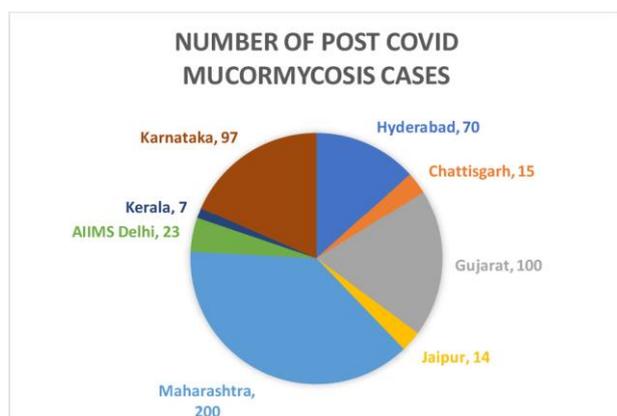


Fig. 1. Mucormycosis cases during COVID-19.

## 3. Treatment of mucormycosis

Early diagnosis of the disease is essential for proper treatment of the disease. The general treatment for mucormycosis is through radical debridement and excision of the infected tissue. The use of antifungal agent like amphotericin-B with high dose of therapy should be used. Empirical antibiotic therapy in case of COVID-19 patients is recommended. Recommendation of mucormycosis treatments includes use of Peripherally inserted central catheter (PICC line) should be installed. Adequate systemic hydration should be maintained., before Amphotericin B infusion, normal saline IV infusion should be used. Patient should be advised for at least 4-6 weeks Antifungal antibiotic. Monitor patients clinically and with radio-imaging for response and to detect disease progression

## 4. Preventive measures

One should avoid contact with person having signs and symptoms of mucormycosis. Because the infection spreads through spores present in air masks should be used while visiting sites having spores. Protective covering

like apron, long sleeve shirts, gloves etc should be used. Personal hygiene should be used.

## 5. Conclusion

During COVID-19 all over India many states were having large number of cases of mucormycosis. It is a disease whose prime target are those persons who are on medication and have reduced immunity to protect their body from secondary infections. About 45,432 cases of which 4,252 have died have been reported up to 15 July 2021 by states and union territories of India. Proper and early diagnosis and treatment is the key to overcome from the disease.

## 6. Conflict of Interest

Authors declare no conflict of interest.

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