

## 'Black Fungus' defacing Covid patients: The current menace

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### Abstract

Mucormycosis is a rare but an opportunistic fungal infection. It has recently gained awareness due to its association with covid-19. The main cause is filamentous fungus *Rhizopus*, which can be inhaled through the nasal passage, oral cavity or even through a cut in the skin, leading to black masses and destruction of bone in hard palate, nasal cavity and skull. Patients suffering from covid-19 are on steroids, which interferes with the patient's immunity and blood sugar levels leading to spread of black fungus. Hence precise knowledge about black fungus, its mode of transmission and precautions to prevent the infection is considered utmost priority in recent times.

**Keywords:** Mucormycosis; Black Fungus; Rhino-Orbito-Cerebral Mucormycosis; Pulmonary Mucormycosis; Covid-19; Corticosteroids

### 1 Introduction

Today, the world faces increasing variants of covid-19, more virulent than the original strain. Other diseases too spin off the source. 'Black fungus' or mucormycosis is one of them. The term is not new as it was first identified by Paultauf in 1885 [1]. However, only now are people becoming increasingly aware of it due to its association with covid-19. The disease has been dubbed "black fungus" because it causes blackening or discolouration over the nasal passage.

Mucormycosis is a rare but opportunistic fungal infection with high morbidity and mortality and is caused primarily by filamentous fungus *Rhizopus*, *Mucor* and *Lichtheimia* species of the fungi of the order *Mucorales*. The spores can be found ubiquitously in fruits, soil, and faeces, are present in the air, can also be cultured from the oral cavity, nasal passages, and throat of healthy disease-free individuals [2].

Ulceration in the mucosa or an extraction wound in the mouth can be a harbor of entry for mucormycosis in the maxillofacial region, particularly when the host is immunocompromised [3].

Inhalation of spores can be through the nasal passage, oral cavity or even through a cut in the skin. The fungus may then spread to the paranasal sinuses and consequently to the orbit, meninges, and brain by direct extension. As they grow in the nasal cavity they relentlessly destroy bones in the nasal cavity and sinuses. These include the hard palate, the orbital bones, and the skull base bones. Black masses may be seen in the nasal cavity and oral cavity. If it destroys the orbit and enters the eye socket it may cause bulging of the eyes, pain, frozen eye movements, and blindness. Once it enters the

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cranial cavity by breaching the skull base it blocks major arteries and veins resulting in major life-threatening brain strokes [4].

Our body's defence mechanisms keep the fungi at bay. However, a weakened immune system will allow these organisms to and unleash morbid and serious lethal infections. People who are at risk include diabetics, and those suffering from leukemia, renal failure, protein-calorie malnutrition, and cirrhosis. The disease also attacks patients who have undergone transplants and those on corticosteroid and immunosuppressive therapy. Local factors that can spark the disease include burns, knife wounds, insect bites, needle pricks and trauma [5].

### 1.1 Association with Covid-19

Mucormycosis may be also triggered by the use of steroids, a life-saving treatment for severe and critically ill Covid-19 patients. Steroids reduce inflammation in the lungs for Covid-19 and appear to help stop some of the damage that can happen when the body's immune system goes into overdrive to fight off coronavirus. But they also reduce immunity and push up blood sugar levels in both diabetic and non-diabetic covid-19 patients, thereby helping the spread of black fungus. Diabetes lowers the body's immune defences, coronavirus exacerbates it, and then steroids which help fight Covid-19 act like fuel to the fire [6].

When it comes to covid-19 there are two types of mucormycosis observed in patients: *rhino-orbito-cerebral mucormycosis* and *pulmonary mucormycosis*.

In Rhino-Orbito-Cerebral Mucormycosis the infection begins from the nasal passage and spreads along the sinus passage to infect the eyes, and brain. Nasal blockage, unusual nasal discharge, facial swelling, pain and numbness are some of the initial symptoms. Over time, headache, eye pain, blurred vision and partial blindness may result [7].

Pulmonary mucormycosis primarily affects the lungs and the respiratory system. Those who catch it develop symptoms such as fever, cough, shortness of breath and chest pain. As the infection spreads, and if not treated well in time, it may lead to the development of pleural effusion [8].

### 1.2 Radiological features

In case of Rhino-Orbito-Cerebral Mucormycosis (ROCM), the patient can undergo an MRI PNS (para nasal sinuses) with brain contrast study, whereas patients suffering with Pulmonary mucormycosis can undergo a Plain CT Thorax. The radiographs may reveal, nodular thickening of sinus mucosa, cloudy sinus, mottled destruction of bony walls of Paranasal sinuses. CT findings show opacification of paranasal sinuses and erosions of the bony walls [9].

### 1.3 Precautionary steps

To prevent a black-fungus infection we offer the following suggestions. First, the public should maintain strict oral hygiene. This is especially important for those who are recuperating from a covid-19 infection. This is because the intake of steroids and other medication enables the bacteria in the oral cavity to grow. Taking care to brush twice or thrice a day and rinsing the oral cavity with clean-ups can help remarkably. Patients are also advised to change their toothbrush once they test negative and keep rinsing their oral cavity regularly.

Second, diabetic patients must undergo frequent periodic testing of their sugar level.

Third, the public should avoid exposure to dust and moisture and keep a distance from soil, tree and plants. If they suspect symptoms, they should immediately report to the medical authorities.

Fourth, to keep sinuses clear, the public is recommended steam inhalation.

Fifth, the public is advised strongly against self-medication, especially the use of steroids.

To conclude, early diagnosis and intervention are the only means for good prognosis and decrease in morbidity which can be achieved, by clinical picture and direct smears. Hence patients with above mentioned symptoms should consider visiting Oral Medicine and Oral Pathology specialists.

## 2 Conclusion

As the world faces different variants of covid-19, the current menace is all about the infections associated with covid-19. Hence acquaintance regarding mucormycosis, one of the infections related to covid-19 is required for early diagnosis and treatment. Plus the prior knowledge about the disease may instigate early precautions to prevent the spread of infection.

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## Compliance with ethical standards

### *Disclosure of conflict of interest*

No conflict of interest.

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