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Cerebro-rhino orbital mucormycosis: COVID-19 pandemic

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Abstract
Mucormycosis, though not new to India, was not as rampant as it is at present. Health experts believe that the over-use of steroids, coupled with low immunity and immune suppression following COVID-19 recovery has made people more vulnerable to contracting the Black Fungus infection. States across India have begun declaring a "black fungus" epidemic as cases of the fatal rare infection shoot up in patients recovering from COVID-19. The fungal disease, called mucormycosis, has a 50% mortality rate. It affects patients initially in the nose but the fungus can then spread into the brain, and can often only be treated by anti-fungal drugs and major surgery removing the eye or part of skull and jaw.[1] Rhino- orbital mucormycosis is surging very fast in post COVID patients and declared as epidemic in country on 20th May, 2021.

Keywords: rhino-orbital, mucormycosis, fungi, COVID-19, anti-fungal

Introduction
Mucormycosis is an uncommon fungal infection which can lead to fulminant necrotizing infection under optimal host condition. Fungi have the ability to invade blood vessels and can affect different parts of the body. The most common, though the most aggressive, form is cerebro-rhino-orbital mucormycosis [2]. It's relatively rare, but also very serious. Formally known as zygomycosis, this infection tends to occur most often if a person have weakened immunity from an illness or health condition [3]. It affects the sinuses, the brain and the lungs and can be life-threatening in diabetic or severely immunocompromised individuals, such as cancer patients or people with HIV/AIDS [4]. Coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) has been associated with a wide range of opportunistic bacterial and fungal infections and one of the emerging complication is Cerebro-rhino orbital mucormycosis.

Epidemiology
Mucormycosis is rare, affecting fewer than 1.7 people per million population each year. However, it is around 80 times more prevalent in India. People of any age may be affected, including premature infants. The first case of mucormycosis was possibly one described by Friedrich Küchenmeister in 1855. The disease has been reported in natural disasters; 2004 Indian Ocean tsunami and the 2011 Missouri tornado. Mucormyosis was seen in far smaller numbers in India before COVID-19. But it is now affecting post-COVID patients in large numbers. During second wave of COVID-19, India has registered 11,717 cases of Black Fungus infection or Mucormycosis till May 25, with maximum cases being reported from Gujarat, followed by Maharashtra. While Maharashtra has reported 2,770 cases, Gujarat has logged 2,859 cases, Andhra Pradesh has registered 768 cases, Madhya Pradesh has 752 cases, and Telangana has 744 cases till May 25th, 2021 [5].

Causes
According to the Centers for Disease Control and Prevention (CDC), mucormycosis is caused by a group of molds called mucormycetes, which are found in soil and organic matter, like compost piles [6]. Recently, several cases of mucormycosis in people with COVID-19 have been increasingly reported world-wide, in particular from India. The primary reason that appears to be facilitating Mucorales spores to germinate in people with

COVID-19 is an ideal environment of low oxygen (hypoxia), high glucose (diabetes, new-onset hyperglycemia, steroid-induced hyperglycemia), acidic medium (metabolic acidosis, diabetic ketoacidosis [DKA]), high iron levels (increased ferritins) and decreased phagocytic activity of white blood cells (WBC) due to immunosuppression (SARS-CoV-2 mediated, steroid-mediated or background comorbidities) coupled with several other shared risk factors including prolonged hospitalization with or without mechanical ventilators [7].

Clinical manifestations

Symptoms of mucormyosis are observed in the patients as having:

- Cough
- Fever
- Headache
- Nasal congestion
- Sinus pain
- Blackened skin tissue
- Blisters
- Fever
- Redness
- Swelling

When to suspect mucormycosis in COVID-19 patients

If the patient is having sinusitis - nasal blockade or congestion, nasal discharge (blackish/bloody), local pain on the cheek bone One sided facial pain, numbness or swelling Blackish discoloration over bridge of nose/palate Toothache, loosening of teeth, jaw involvement Blurred or double vision with pain; fever, skin lesion; thrombosis & necrosis (eschar) chest pain, pleural effusion, haemoptysis, worsening of respiratory symptoms.

Diagnosis

Diagnosis includes biopsy of the affected tissue and confirming it with a fungal culture. Other tests include culture and direct detection of the fungus in lung fluid, blood, serum, plasma and urine. Blood tests include a complete blood count to look specifically for neutropenia. Other blood tests include iron levels, blood glucose, bicarbonate, and electrolytes.

Treatment

Mucormycosis can be treated by administration of antifungal drugs and drug of choice are Amphotericin B (given Intravenously), Posaconazole (given through an IV or orally), Isavuconazole (given through an IV or orally) [8]. Surgical management includes removal of infected tissues. Removal of the palate, nasal cavity, or eye structures can be very disfiguring. Hyperbaric oxygen has been used as an adjunctive therapy, because higher oxygen pressure increases the ability of neutrophils to kill the fungus. Monitoring blood glucose level in diabetic patients plays a very important role in preventing and treating mucormycosis in COVID patients.

Table 1: Do's and Don't's to prevent post-COVID mucormycosis

Do's	Dont's
▪ Control hyperglycemia	▪ Do not miss warning signs and symptoms
▪ Monitor blood glucose level post COVID-19 discharge and also in diabetics	▪ Do not consider all the cases with blocked nose as cases of bacterial sinusitis, particularly in the context of immunosuppression and/or COVID-19 patients on immunomodulators
▪ Use steroid judiciously - correct timing, correct dose and duration	▪ Do not hesitate to seek aggressive investigations, as appropriate (KOH staining & microscopy, culture, MALDITOF), for detecting fungal etiology
▪ Use clean, sterile water for humidifiers during oxygen therapy	▪ Do not lose crucial time to initiate treatment for mucormycosis
▪ Use antibiotics/antifungals judiciously	

Discussion

Mucormycosis is primarily a disease which affects persons with altered host defenses associated with the underlying conditions and predisposing factors such as diabetes mellitus, corticosteroid therapy, organ transplantation etc. Diabetic patients are predisposed to mucormycosis because of the decreased ability of their neutrophils to phagocytize and adhere to endothelial walls [9]. High blood sugar level may also alter the ability of macrophages. As observed during the second wave of COVID-19, cases of rhino-orbital mucormycosis are increasing day by day resulting in increased mortality rate in COVID patients. Surge wave of mucormycosis during pandemic can be prevented by ensuring personal hygiene, wearing face masks and face shields when going to dirty polluted environments and wearing clothing of concealed shoes, long pants, long-sleeved shirts and gloves while coming in contact with soil, moss, manure or visiting the hospital or crowded areas.

References

1. The guardian for 200 years. Black fungus' disease linked to COVID spreads across India. Available at: https://www.theguardian.com/world/2021/may/21/mucormycosis-black-fungus-disease-linked-COVID-spreads-india
2. Upender Walia, Abdullah Balkhairb, Abdullah Al-Mujainia. Cerebro-rhino orbital mucormycosis: An update. Journal of Infection and Public Health 2012;5(2):116-126.
3. Healthline. Mucormyosis. Available at: https://www.healthline.com/health/mucormycosis
4. BBC News. Sautic Biswas. Mucormycosis: The 'black fungus' maiming COVID patients in India. Available at: https://www.bbc.com/news/world-asia-india-57027829
5. Manvi Kapoor. Quartz India. Why does India have so many cases of post-COVID mucormycosis. Available at: https://qz.com/india/2012257/why-india-has-so-many-cases-of-mucormycosis-or-black-fungus/
6. George Citroner. Health News. How COVID-19 Surge Is Related to a Black Fungus Outbreak. Available at: https://www.healthline.com/health-news/how-COVID-19-surge-is-related-to-a-black-fungus-outbreak
7. Awadhesh Kumar Singha, Ritu Singha, Shashank Joshi R *et al*. Mucormycosis in COVID-19: A systematic review of cases reported worldwide and in India. Diabetes & Metabolic Syndrome: Clinical Research & Reviews 2021.

8. Healthline. Mucormyosis. Available at: https://www.healthline.com/health/mucormycosis
9. Rasoul Mohammadi, Mehdi Nazeri *et al*. A successful treatment of rhinocerebral mucormycosis due to *Rhizopus oryzae*. Journal of research in medical science 2014;19(1):72-74.
10. The Hindu, Declare mucormycosis an epidemic, Centre tells States. Available at: https://www.thehindu.com/news/national/declare-mucormycosis-an-epidemic-centre-tells-states/article34605042.ece
11. Seyda Karadeniz Ugurlu, Sedat Selim, Aylin Kopar *et al*. Rhino-orbital Mucormycosis: Clinical Findings and Treatment Outcomes of Four Cases. Turkish Journal of Ophthalmology 2015;45(4):169-174.
12. Mostafa Mohamed S, Hesham Abdel-Motaleb Y, Fahmy Mobarak A. Management of rhino-orbital mucormycosis. Saudi Medical Journal 2015;36(7):865-868.
13. Upender Walia, Abdullah Balkhairb, Abdullah Al-Mujaini. Cerebro-rhino orbital mucormycosis: An update. Journal of Infection and Public Health 2012;5(2):116-126.