

## RHINO MAXILLARY MUCORMYCOSIS IN COVID-19 RECOVERED PATIENT :A CASE REPORT

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### ABSTRACT

Mucormycosis also known as zygomycosis caused by mucorales present in air and soil leads to development of infection in different parts of body common in rhinocerebral area, sinuses, lungs gastrointestinal tract. The major risk factor for its development is diabetes mellitus or any other condition which causes immune suppression. It is a lethal secondary infection seen in COVID -19 infected patients. We present a case of 48 year old diabetic COVID-19 recovered patient who was diagnosed as a case of rhinomaxillary mucormycosis. He was treated with surgical debridement and Amphotericin B along with strict glycemic control. Early diagnosis and treatment can prevent morbidity and mortality in case of mucormycosis infection.

**KEYWORDS:** Mucormycosis, Maxillary, COVID-19, Diabetes.

### INTRODUCTION

Mucormycosis caused by inhalation of spores of mucormycetes which is frequently present in soil, air and animal dung and leads to severe angioinvasive infection in different parts of body. The prevalence of mucormycosis is several times higher in India as compared to developed countries, approximately accounting for 0.14 cases per 1000 population. Risk Factors associated with Mucormycosis are diabetes mellitus, immunocompromised state, and malignancy. Uncontrolled Diabetes most common risk factor for mucormycosis in India. Clinical forms of mucormycosis are classified on the basis of anatomic location rhino orbital cerebral mucormycosis is most common form other being pulmonary, cutaneous, cerebral, renal and gastrointestinal.

### CASE REPORT

A 48 year old Post COVID -19 patient came to OPD after one week of recovery with chief complaints of pain and numbness right side of face 3 days and nasal congestion and headache 1 day. Physical examination showed necrotic black discoloration of nasal mucosa. Laboratory investigation showed mildly raised total leucocyte count (15000), blood glucose levels were raised (320mg/dl) and glycated hemoglobin was 10.8%. X ray and Computed Tomography scan of paranasal sinuses was advised. X ray paranasal sinus

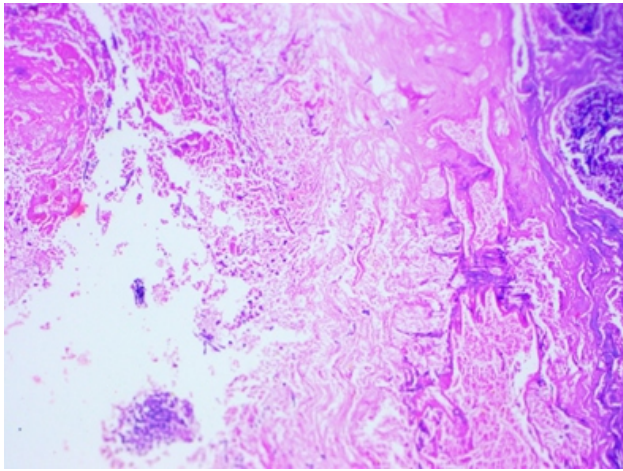
shows opacification in right maxillary sinus. CT showed non homogenous opacification of right maxillary sinus with erosion of wall of maxillary sinus and erosion of nasal bone. Patient was a known case of Diabetes mellitus with poor glycemic control; he had been admitted to high dependency unit for one week and was given high dose of i.v. corticosteroids for one week followed by oral tapering dose to control COVID-19 infection. With the ongoing Pandemic of COVID-19 and high susceptibility of fungal infection in such patients histopathological examination was done to confirm the fungus. Following the debridement of necrotic mucosa was done and tissue was sent for histopathological examination to our department of pathology. We grossly received multiple grey black soft tissue pieces all together measuring 2.8X2 cm. Tissue was processed, sections were made and stained with hematoxylin and eosin stain. Microscopic examination of the tissue showed areas necrosis. Broad non-septate hyphae branching at right angles was seen along with acute inflammatory infiltrate comprising of predominantly degenerated and viable neutrophils (Figure1). The fungal hyphae were seen invading the blood vessels, angioinvasion (Figure2). Periodic Acid Schiff's stain was done which was positive and accentuated the fungal hyphae (Figure 3). A diagnosis of rhino maxillary mucormycosis was made.

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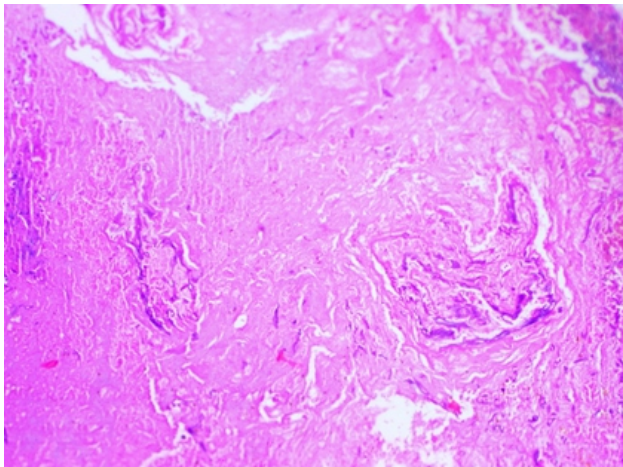
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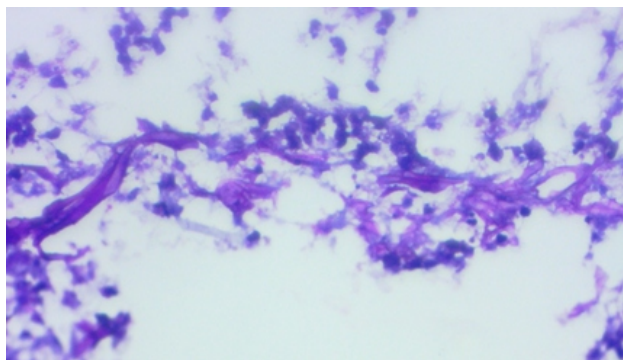
Patient was advised strict glycemic control along with injection of microosomal Amphotericin B and surgical debridement of necrosed tissue from right maxillary sinus and nasal mucous.



**Fig. 1: 10X, H&E Stain Shows Broad Non-septate Hyphae of Mucormycosis**



**Fig. 2: 10X, H&E Stain , Photomicrograph Show Fungal Hyphae Inside Blood Vessel**



**Fig. 3: 10X, PAS Stain Shows Broad Non-septate Hyphae of Mucormycosis**

## DISCUSSION

Severe acute respiratory syndrome coronavirus responsible for causing COVID-19 disease acts mainly by attacking via Angiotensin converting enzyme -2 (ACE) receptor found on epithelium of respiratory tract and stimulates immunologic cascade followed by cytokine response which not only affects vascular system but individual cell as well SARS CoV-2 virus is a single stranded RNA virus and encodes for RNA dependent RNA polymerase (RdRp) ,structural protein spike, envelope ,membrane, nucleocapsid and other proteins. The proteins that are used in diagnosis of COVID-19 are RdRp, nucleocapsid and envelope proteins

Mucormycosis also known as zygomycosis is a rare fungal infection with high morbidity and mortality. The fungus causing mucormycosis are *Rhizopus* species, *Mucor* species, *Rhizomucor* species. Most of the cases of mucormycosis approximately 70% are caused due to *Rhizopus oryzae*.

The prevalence of high number of vulnerable population like diabetics and widespread presence of Mucorales in the surrounding along with lack of awareness and lack of regular health checkups in India is responsible for high number of mucormycosis in the country. In COVID-19 infection impaired immune system, hypoxia, diabetes, excess use of steroids and antibiotics along with environmental factors are responsible for high incidence of mucormycosis in such patients. According to study done by M Sen, D Garg and Adith COVID-19 positive patients with mucormycosis that they studied had high blood glucose levels and all except one had received corticosteroid. The most common site involved by mucormycosis in COVID-19 infected and recovered patients was nose and paranasal sinus followed by rhino-orbital and 80% of these patients had pre-existing diabetes mellitus. The main pathology responsible for necrosis is angioinvasive nature of the fungus which invades the blood vessels leading to thrombosis and necrosis of the tissue supplied by that vessel. In case of maxilla there is thrombosis of internal maxillary artery which leads to necrosis of maxilla. The dead tissue is nest for development of additional growth of microorganisms. The diminished oxygen supply to the affected area due to thrombosis leads to inability of leucocytes to reach the site of infection. Damage and penetration of endothelial cells is also an important event in pathogenesis of mucormycosis.

The symptoms and sign for mucormycosis depend on the site involved Rhinocerebral mucormycosis

presents with facial pain, headache and nasal stuffiness. Pulmonary mucormycosis presents with fever, chest pain and cough. Gastrointestinal mucormycosis presents with nausea vomiting and abdominal pain. Disseminated mucormycosis present with varying symptoms. Radiological examination along with culture and histopathological confirmation is needed to diagnose mucormycosis. The identification of broad non-septate hyphae with branching at 90 degree angles is seen histologically in cases of mucormycosis which needs to be differentiated from aspergillosis which has thin septa with acute angle branches.

Early diagnosis and treatment is needed to limit the necrosis of tissue which spreads rapidly and can be life threatening. The drug of choice for treatment of mucormycosis is Amphotericin B. It has been observed that high cure rate is observed in patients managed by drug therapy along with surgical treatment. Other antifungals used in treatment are posaconazole, isavuconazole. Delay in diagnosis and treatment leads to high mortality to prevent this careful watch on initial signs of mucormycosis with prompt treatment is necessary.

## CONCLUSION

Mucormycosis a rare angioinvasive fungus affects mainly immunocompromised individuals it is seen to occur in COVID-19 infected and recovered patients during the second wave. Early diagnosis and treatment is instrumental in preventing morbidity and mortality.

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