

Mucormycosis following Covid-19 – Onerous diagnosis : A case report

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ABSTRACT

Mucormycosis is one of the most sudden, severe and fatal fungal infection in humans, with a high mortality rate. It is most often caused by the *Rhizopus*, *Rhizomucor* and *Cunninghamella* genera of the family Mucoraceae. Mucormycosis is a disease of the diseased and is not commonly seen in healthy people. Diabetes, chronic kidney disease, desferroxamine use in dialysis, leukemia, lymphoma, immunocompromised state, burns and open wounds are the risk factors of mucormycosis. We present a case of 48 years old male patient who came with the chief complaint of swelling in his right side of face since 2 months, which was initially clinically diagnosed as osteomyelitis and later confirmed to be mucormycosis following radiographical and histopathological examination.

Introduction

Mucormycosis is an acute opportunistic infection caused by saprophytic fungus of class Phycomycetes order Mucorales and family Mucoraceae, found in soil, bread molds, and decaying fruits and vegetables. Most common species associated are *Rhizopus*, *Rhizomucor*, *Absidia* and *Cunninghamella*^[1] The term rhinocerebral mucormycosis (RCM) is used if the facial, palatal, orbital, paranasal sinus or cerebral regions are involved and the patients generally present with signs and symptoms primarily located in these regions. *Rhizopus* is the predominant pathogen, accounting for 90% of the cases of RCM. The three subtypes of RCM are rhinomaxillary, rhino-orbital and rhino-orbitocerebral mucormycosis^[2] Since mucormycosis is a rare condition, it may pose a diagnostic challenge. As immunocompromised or diseased individuals are more likely to suffer from this

disease, early diagnosis aided by a hematologic, biochemical and radiologic investigations lead to prompt and aggressive surgical management, with the institution of specific antifungal therapy to ensure a good prognosis, thereby reducing the fatal complications associated with this disease.^[3]

Case Report

A 48-year-old male patient came with the chief complaint swelling in the right side of face since 2 months. He was a known diabetic for 13 years, history of covid-19, 4-months back, also had history of kidney infection since 3months, history of nasal discharge with foul smell 1 day back and blurring of vision. On extra-oral examination a mild diffuse swelling was seen on right side of the face (figure:1). On intraoral examination there was segmental mobility in right

maxilla, no discharge was present clinically (figure: 2) and swelling was present in the right palatal region (figure:2). On the basis of this provisional diagnosis of osteomyelitis was made involving right maxilla. Investigations showed increased D-dimer: 3076, CRP: 78, blood sugar levels (FBS 158 mg/dl, RBS 226 mg/dl), which gave a clue for considering mucormycosis in the differential diagnosis.

Patient was advised for Orthopantomograph (OPG)(figure: 3) which showed haziness of right maxillary sinus and CBCT (figure: 4) was also performed which gave the impression of right-side maxillary osteomyelitis probably due to mucormycosis with involvement of the hard palate, MRI PNS (figure:5) without contrast was done which was also suggestive of fungal sinusitis, MRI orbit without contrast was also performed which reveals no significant abnormality, MRI brain without contrast was also performed which reveals no significant abnormality after which biopsy was done which showed pieces of bone, necrotic debris, and inflammatory infiltrate along with branched non- septae fungal hyphae of mucormycosis. On the basis of this final diagnosis of mucormycosis involving right maxilla was made.

Then the patient underwent inferior maxillectomy with palatectomy. Antifungal medication Posaconazole 300 mg tablets twice daily (1 bid) for 15 days Hydrogen peroxide mouthwash 3 times a day for 15 days A to Z (multivitamin) capsule for 15 days. The patient has been asked to come for a checkup after 3 days, 1 week, and fortnight (15 days).

Discussion

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^[3]. Both *Aspergillus* and *Candida* have been reported as the main fungal pathogens for co-infection in people with COVID-19^[2]. 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. Mucormycosis is an uncommon but a fatal fungal infection that usually affects patients with altered immunity. Mucormycosis is an angioinvasive disease caused by mold fungi of the genus *Rhizopus*, *Mucor*, *Rhizomucor*, *Cunninghamella* and *Absidia* of Order- Mucorales, Class- Zygomycetes^[4]. The *Rhizopus Oryzae* is most common type and responsible for nearly 60% of mucormycosis cases in humans and also accounts for 90% of the Rhino-orbital-cerebral (ROCM) form^[5]. Mode of contamination occurs through the inhalation of fungal spores^{[6] [7]}. While long term use of corticosteroids have often been associated with several opportunistic fungal infection including aspergillosis and mucormycosis, even a short course of corticosteroids has recently been reported to link with mucormycosis especially in people with DM^[8]. There are few case reports of mucormycosis resulting from even a short course (5–14 days) of steroid therapy, especially in people with DM^[9]. Management is based on prompt diagnosis and institution of early aggressive surgical and medical therapy. Treatment of the underlying systemic disease, especially control of the glycemic state or modification/cessation of immunosuppressive drugs help in decreasing the morbidity and mortality associated with mucormycosis.



Figure: 1 Extra-oral profile of the patient showing swelling in the right side of face



Figure 3: Orthopantomogram

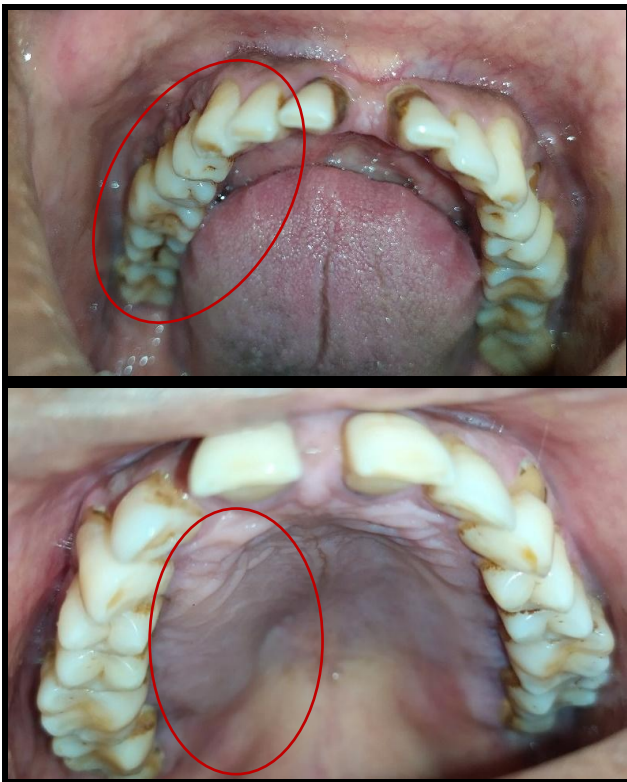


Figure 2: Intraoral picture



Figure: 4 CBCT scans

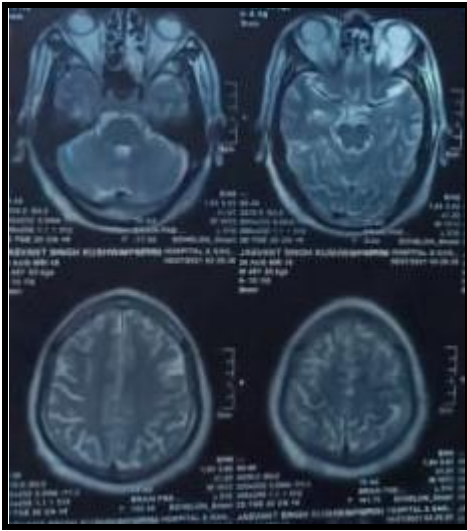


Figure 5: MRI PNS

Amphotericin B is the polyene antifungal drug commonly used, which binds to ergosterol in the fungal cell membrane altering its permeability. It is a very toxic drug hence the patient has to be monitored for renal damage and anaphylaxis. Posaconazole is another antifungal drug, a triazole which is also very effective besides being safe for patients with renal disease. Since the involved blood vessels are ischemic, the antifungal drugs do not reach their target tissues hence extensive surgical debridement to remove necrotic tissue and establish sinus drainage is essential. Hyperbaric oxygen therapy has been used as an adjunct to aggressive surgical debridement, amphotericin B therapy, control of any underlying predisposing conditions by aiding neovascularization and subsequent healing. Granulocyte colony-stimulating factor may also be administered to improve host defences and also to enhance leukocyte count to promote immunity. Our case is also a case of post covid mucormycosis with known history of diabetes mellitus and kidney infection but due to early diagnosis and prompt treatment the prognosis is good.

SUMMARY

A poorly controlled diabetic or immune compromised patient having pathology in the maxilla/palate with or without pus discharge and possibly a history of covid-19 in the present scenario should warn the oral physician of a supposed RM infection which if diagnosed early can minimize the complications. A prompt diagnosis ensures a better prognosis for the patient suffering from this otherwise fulminant, fatal fungal infection.

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