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Mucormycosis in Post Covid Patient - A Case Report

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Abstract

Mucormycosis is considered to be a rare notorious fungal infection mainly affecting diabetics with or without ketoacidosis & immunocompromised patients, with high mortality rate. Occurrence of Mucormycosis as an implication of Covid-19 has not yet been reported. We present a case of aggressive mucormycosis in a Post covid-19 type-2 diabetic patient and aim to illustrate the possible Covid-19 effects on body and a dire need for early diagnosis.

Keywords *- Mucormycosis, Covid-19, ACE2 receptors, Type 2 Diabetes Mellitus, Iron overload*

Introduction

Mucormycosis is a rare angioinvasive, acute opportunistic, progressive condition caused by saprophytic fungus. This lethal form of fungal infection, involves nose & paranasal sinuses. It is most commonly seen affecting immunocompromised patients who are on steroidal or cytotoxic therapy and is life threatening to patients with uncontrolled diabetes. Underlying malignancy, renal failure, malnutrition can act as predisposing factors.

On the other hand Covid-19, which is caused by Severe acute Respiratory syndrome corona virus 2(SARS-COV-2) turned out to be highly contagious infection with an increased mortality and economic morbidity worldwide. It has primary symptoms of fever, cough & fatigue leading to pneumonia and even multi organ failure.[1]

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Even though maxilla is richly vascular which rarely lets it getting necrosed, bacterial infections like osteomyelitis, viral and even fungal infections like aspergillosis, mucormycosisetc can still affect/cause (necrosis) it.[2,3]

Despite of this mucormycosis on palate is considered a rare and late possibility.[4]

Smoking has previously been linked to mucormycosis occurring in mandible as an initiator to the infection.[5] But relationship between COVID-19 and mucormycosis has not been thoroughly explored to date.

The present case report is of mucormycosis presenting as a chronic ulcer on palate in a COVID-19 recovered diabetic patient. The aim of this report is to alert the clinicians to be aware of mucormycosis as one of the common side effect of COVID-19 infection.

Case Report

A 65-year -old male diabetic patient was presented to the outpatient department with chief complaint of an ulcerative growth in hard palate from past 20-25 days with no pain. Patient also complained of headache and vomiting from last 4 days.

Past medical history revealed that the patient was a known case of hypertension, type II diabetes mellitus and

was on medication. On general physical examination, the patient was found to be moderately built and poorly nourished with abnormal gait. His Random blood sugar (RBS) was reported to be 320 mg/dl. His blood pressure was 190/90 mm of Hg, pulse rate was 96 beats/min. Patient was also reported to be a survivor of Covid-19, 2 months back.

On Intraoral examination, a necrotic ulcerative lesion was noticed in the centre of the hard palate, measuring approximately 3x2cm in diameter. It was covered in blackish gray slough with everted borders, had a smooth surface and showed no sign of bleeding on inspection (Image 1). There was no pain and the ulcer was attached to the underlying bone. It was extending from palatal rougae to posterior aspect of hard palate. No lymph nodes were palpable. A provisional diagnosis of osteomyelitis was made. The differential diagnosis of fungal infection and squamous cell carcinoma was given.

The lesion was excised. Soft tissue specimen obtained was brown in color, measuring around 2 x 1.5 cm in diameter, soft to firm in consistency with irregular surface. After subjecting to routine processing, H & E stained tissue under microscopic examination revealed the presence of numerous large, branching (at 90 degree) of non septate hyphae in the background of hyalinzed connective tissue stroma. Few area showed the presence of neural bundles. Dense chronic inflammatory cell infiltrate mainly composed of lymphocytes and plasma cells were present at the periphery which confirmed the diagnosis of mucormycosis. (Image 2)

After the procedure, patient was provided with an obturator for the oro-nasal fistula and is being followed up.

Image 1: Ulcerative necrosed lesion

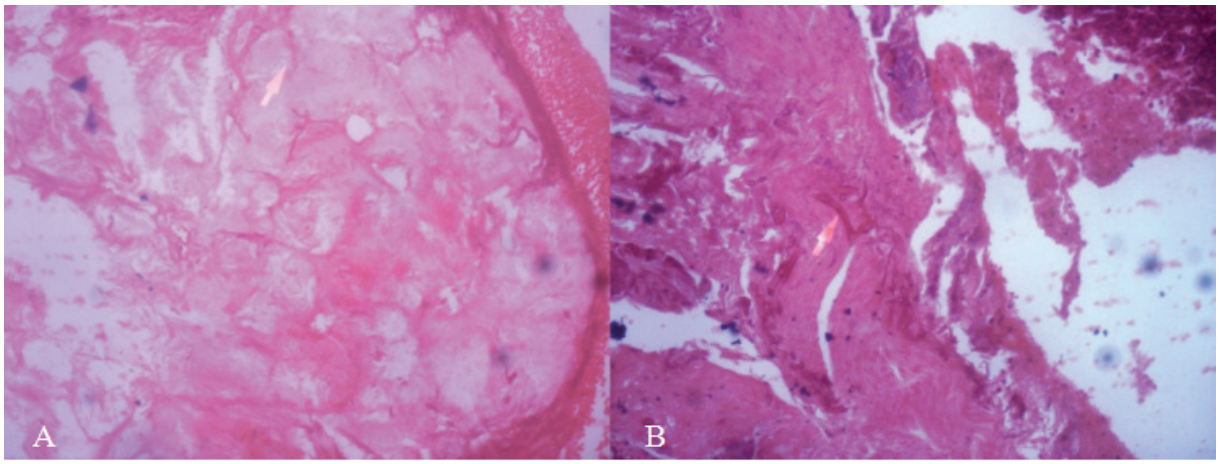

Image 2 : H & E stained section showing large, non septate fungal hyphae branched at 90 degree (A)10x (B) 20x

Discussion

Alternately coined as zygormycosis, this rare but rather notorious mucormycosis is well known for being fatal, especially in immunocompromised or diabetic patients. It is an aerobic fungi of saprophytic origin commonly found in bread molds or decaying vegetation. They most commonly colonize the oral, nasal, pharyngeal mucosa and paranasal sinuses.[6]

Predisposing factors playing a role are leukemia, diabetes(patients with or without ketoacidosis), organ transplant, AIDS & renal failure[7],prolonged and severe neutropenia, iron overload, major trauma, prolonged use of corticosteroids, illicit intravenous drug use, neonatal prematurity and malnourishment can also lead to mucormycosis.[8]

Occurrence of infections and even death due to invasive fungal infections, is found to be greater in patients who have iron overload. In fact decreased posttransplantation survival is directly related to hepatic iron overload.[9] Researchers have found iron to be as important a nutrient to fungi as humans. Growth of wide range of fungi in body fluids, cells and tissues is stimulated by excess iron.[10]

It was also found that iron free environment is essential for proper innate and acquired immune response. Any excess of iron (iron overload) would lead to direct damage to our natural defense system and an increase in fungal virulence.[11]

Diabetic patients have impaired defense mechanism along with increased level of iron in tissues.[12,13] This can be co-related with our present case where the patient was diabetic & poorly nourished.

Swaminathan et al in 2007 suggested that iron plays a pathogenic role in diabetes and its complications such as microangiopathy and atherosclerosis.[14]Aregbesola A. et al in 2016 explained the excessive iron stored in body can play an important role in causing type 2 diabetes. They also concluded that the strength and direction of the association between body iron and glucose metabolism is strongest among subjects in prediabetes state.[15]A high 90 day mortality range of 20-58%, makes mucormycosis a life threatening infection. Less traditionally it has also been found to be associated with critical illness, major surgery and pneumonia. [16]

On the flip side Covid-19, caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) which appeared for the first time in Wuhan, China, came out to be a highly contagious newly recognized infection. With human to human transmission it had a worldwide impact. Initial symptoms of fever, cough and fatigue that quickly progress to severe respiratory illness & pneumonia were noted. [17]

Several patients were observed with atypical manifestations such as conjunctivitis, asymptomatic infections at the onset of the illness and even sudden irreversible hearing loss post Covid-19 recovery.[18,19]

A sudden spike in reports of incidence of mucormycosis in Covid-19 patients throughout India raised an alarm. Experts warned that Covid-19 patients were the most vulnerable ones facing the risk of contracting the infection. Despite very low number of reported cases, it is quite significant to consider the possibility of a relationship between Covid-19 and mucormycosis.

In a recent study it was discovered that the SARS-CoV-2 virus damages the endothelial cells in lungs, heart, kidneys, liver and intestine of Covid-19 patients, thus damaging the blood vessels. These endothelial cells have an influence upon immune response. It was concluded that may be Covid-19 is a respiratory illness only to start with, but is actually a vascular illness that kills people through it's involvement of the vasculature.[20]

Teeth have an intimate connection with the rest of body. It has been suspected that the sudden spike in the cases of dental deterioration in Covid-19 patients could ultimately be related to problem with blood flow, which can form clots. Oral cavity gets vandalized when it's devoid of blood flow. Gums are extremely vascularized and pulp of teeth consists of blood vessels with nerves. The reported self exfoliation of teeth in the Post Covid-19 recovered case with no bleeding suggested that blood flow was obstructed. This can be due to vascular damage caused by Covid-19 on the body which persists even after the patient has recovered.[21]

It was also found that Angiotensin converting enzyme 2 (ACE2) receptors which are richly present in lungs are also found in abundance on the epithelial cells of oral mucosa, not only facilitate the virus entry but even affects the pathophysiological process of virus induced acute lung injury (ALI), as well as other organ damage.[22,23]

It is thus suggested that apparently there is a biological pathway by which Covid-19 virus can directly affect mouth. The presence of ACE2 receptors in oral cavity can provide a good habitat for Covid-19 virus to encamp and replicate.

Conclusion

Till date, very few cases have been found in the literature. So, we assume ours as one of the first reported cases. With widespread presence of the virus, dangerous effects of mucormycosis, and growing dental problems in covid-19 recovered cases, it is pertinent to investigate this further. Given the mortality rate of both Covid-19 and mucormycosis we must pay heed to diagnose this fungal infection at initial stage. It is suggested that Post Covid-19 patients are enquired about having any dental problems and any patient with symptoms must be treated on urgent basis. As being noticed, Covid-19 is turning out to be a thousand piece puzzle, and now we as dentists need to be vigilant more than ever to identify the pieces of this puzzle.

Conflict of Interest - None

Ethical Clearance - Since it was a case report, no ethical clearance was needed. But informed consent was taken from the patient.

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