



Regional Re-Emergence of Mucormycosis in Post SARS CoV-19 Patient: A Case Report

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Abstract

Mucormycosis, a fungal infection, has been on the rapid rise with SARS-CoV-19-infected patients who are either immunocompromised, on corticosteroid therapy or have comorbidities such as diabetes mellitus. These causes have been observed to cause a re-emergence of infection in patients, which has been highlighted in our case report. Here we present a 37-year-old male patient with complaints of left-sided headache and facial oedema with a post-COVID status and a previous FESS. The proper dosage of corticosteroids, regular monitoring of blood glucose levels, and increased patient immunity with regular follow-ups have been observed to decrease the incidence of mucormycosis cases in post-COVID patients.

Keywords: SARS CoV, FESS, Rhino cerebral Mucormycosis, Glucocorticoid therapy, Uncontrolled Diabetes mellitus

Introduction

Mucormycosis is one of the most rapidly progressing and fulminant forms of fungal infection, which usually begins in the nose and paranasal sinuses following inhalation of fungal spores [1]. It is a saprophytic fungal organism that invades the blood vessels [2]. This infection is commonly seen in the maxillary and sino-orbital regions in patients with an immunocompromised state like diabetes. High glucose levels induce excessive glycosylation of proteins, for example, transferrin and ferritin, diminishing iron affinity. This causes suppression of T-lymphocyte induction, interferon γ , and phagocyte-mediated killing, leading to a detrimental effect on the immune response [3]. Clinically, the disease is marked by progressive necrosis, which may lead to the involvement of the cranium, causing

a lack of blood supply. Therefore, with a vigilant watch on the blood glucose levels, antifungals are the first line of treatment for mucormycosis.

Case Report:

A 37-year-old male patient, HbsAg positive, k/c/o Type 2 Diabetes Mellitus for five years, post SARS-CoV19 status, post-op status from a previous FESS, had presented with a left-sided headache for 12 days. Headache was associated with facial oedema on the left side. The patient was admitted for further management at our hospital. On examination, the patient's vitals were stable. Local examination revealed visible left-sided facial oedema and minimal sinus tenderness. The patient was initially diagnosed with COVID-19 and was treated with IV Remdesvir, IV Methylprednisolone, Tocilizumab, oxygen

support, HFNC, and other supportive care. Later, on the 10th day of admission, he complained of sinus tenderness and underwent FESS with histopathological confirmation of Mucormycosis.

His significant investigations are S. creatinine: 1.6 mg/dl with a gradual increase to 1.7 and 2.5 mg/dl. S. urea: 74mg/dl, S. Potassium was consistently low with a value of 3.3-3.4 mg/dl, magnesium: 1.5, CBP-Hb of 10.7g/dl, PCV-of 31.0, and an RBC count of 3.64. His initial lymphocyte count was on the lower end, at 16% (normal range 20–40), which subsequently decreased to 14% and increased to 19% on discharge. ALP was raised (323). Inflammatory markers such as CRP: positive (24) and ESR: elevated (90). The remaining investigations are cited in the table below (Table 1).

Imaging of Paranasal Sinus MRI with and without contrast has shown mucosal thickening and hyperintensities in the paranasal sinuses as described in the figures and significant oedema in the medial half of the left orbit involving orbital fat and

extraocular muscles, which was suggestive of orbital cellulitis (Figure 1 and Figure 2). The 3D CT face showed post-operative changes from his previous FESS surgery, with the widening of the left osteomeatal unit with non-visualization of the middle and superior turbinates. Mucosal thickening in the sphenoid, ethmoid, and frontal sinus on the left side, along with bilateral maxillary sinus and orbital extension (medial wall and floor). (FIGURE 3).

While being closely monitored and on insulin therapy, the patient underwent a repeat FESS under general anaesthesia. Black necrotic tissue was noted over the ethmoids, inferior turbinate, and septal region were debrided, with subsequent histopathological confirmation of Mucormycosis. The patient was administered intravenous fluids and was prescribed Inj Liposomal Amphotericin B 50 mg in 5% DNS over 3 hours for two days, followed by 75mg for seven days and other supportive measures. The patient improved clinically and was followed up regularly.

Table 1 : Investigations - During the course of hospital stay

TEST	TEST VALUE (RANGE)	NORMAL VALUE (RANGE)
RBS	~180mg/dl	Normal 80-140mg/dl
S.Creatinine	1.6mg/dl à 1.7 à 2.5mg/dl later normalised	Normal-0.7 to 1.3 mg/dL
S.urea	54-74mg/dl	Normal-6-24mg/dl
S.Potassium	3.3-3.4mg/dl	Normal – 3.5-5.0mg/dl
Magnesium	1.5- 2.0 mg/dl	Normal- 1.6–2.5 mg/dl.
Hb	10.7- 11.0 g/dl	Normal- 11.6 to 15 g/dl
PCV	31.0- 32.4 %	Normal- 35.5 to 44.9%
RBC count	3.64 – 3.89 million/ μ L	Normal- 4.2 - 5.4 million/ μ L
WBC	13,000 – 16000 /cu mm	Normal- 4,000 – 11000 /cu mm
lymphocytes	16% à 14% à 19% on discharge	Normal - 20-40%
ALP	~323	Normal – 44-147 IU/L
Albumin	~3.7	Normal – 3.4-5.4 g/dl
CRP	~24	Normal - <10 mg/dl
ESR	90 mm/hr	Normal – 0-22 mm/hr
Procalcitonin	Normal throughout the hospitalization	Normal - less than 0.1 ng/mL

Ferritin	Normal throughout the hospitalization	Normal-12 to 150 ng/mL.
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Figure 1 : MRI CONTRAST OF PARANASAL SINUS (T2 FLAIR/HYPERINTENSITY)

- A. The red arrow shows mucosal thickening & T2 hyperintensity noted in bilateral maxillary sinuses, left ethmoidal and sphenoid sinuses
- B. The red arrow shows significant oedema noted in the medial half of the left orbit involving orbital fat and extraocular muscles s/o orbital cellulitis
- C. The red arrow shows mucosal thickening & T2 hyperintensity in the left frontal sinus

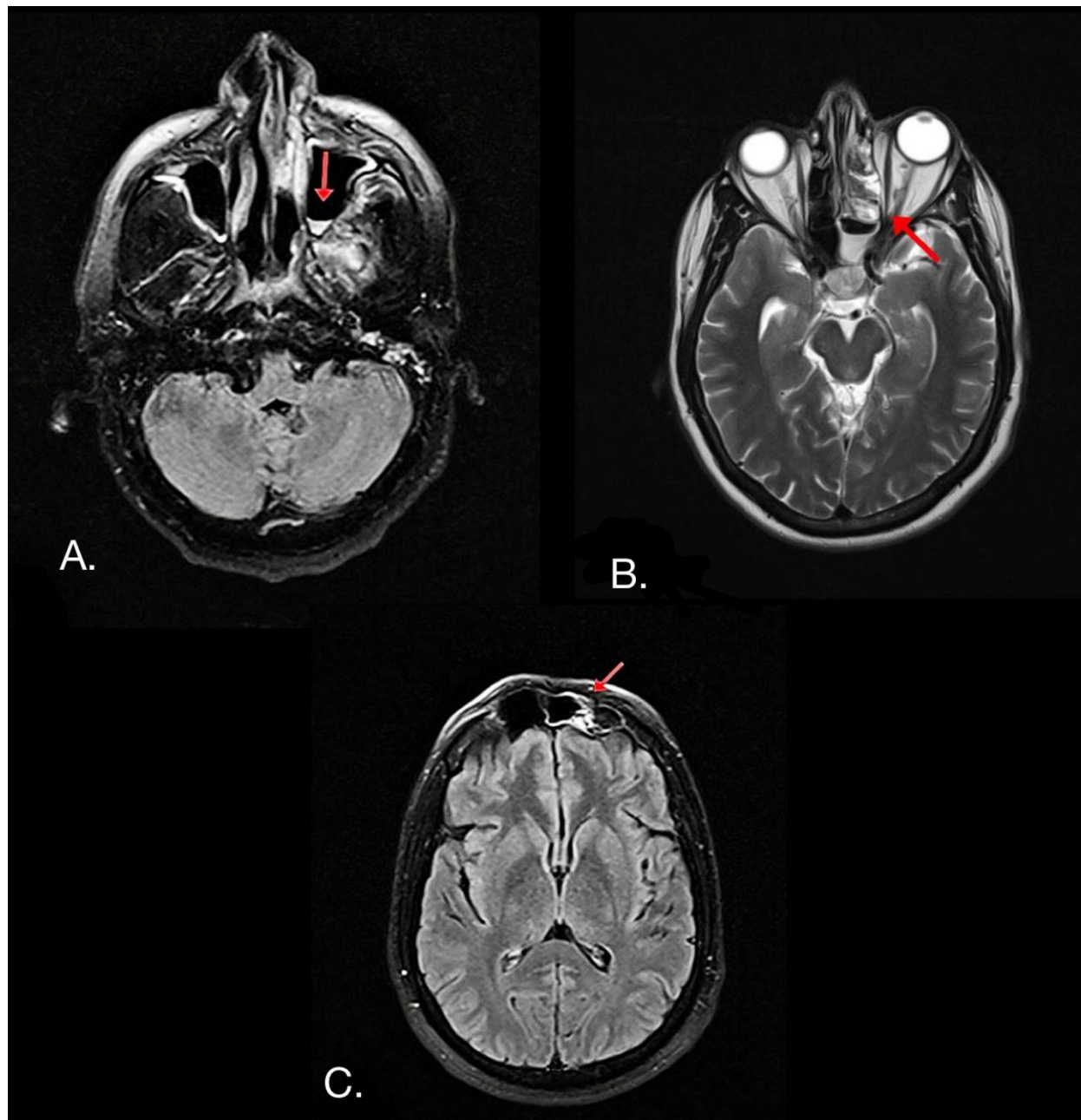


Figure 2 : MRI CONTRAST OF PARANASAL SINUS (T2 FLAIR/HYPERINTENSITY)

- A. The red arrow shows a widening of the left osteomeatal unit.
- B. The red arrows show focal erosion along the left lamina papyrcea with hyperintensity in adjacent orbital fat and preseptal oedema

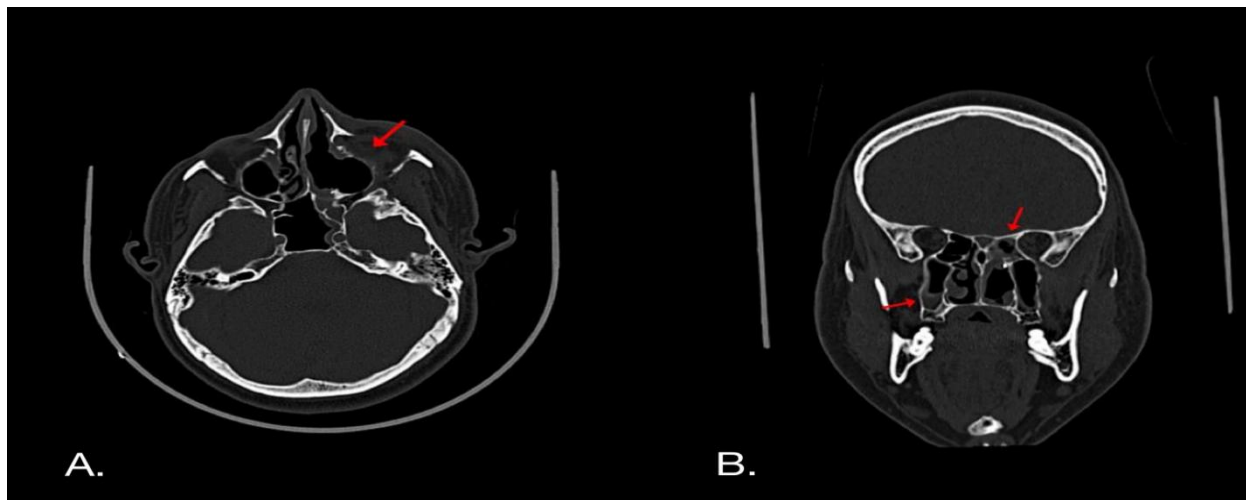
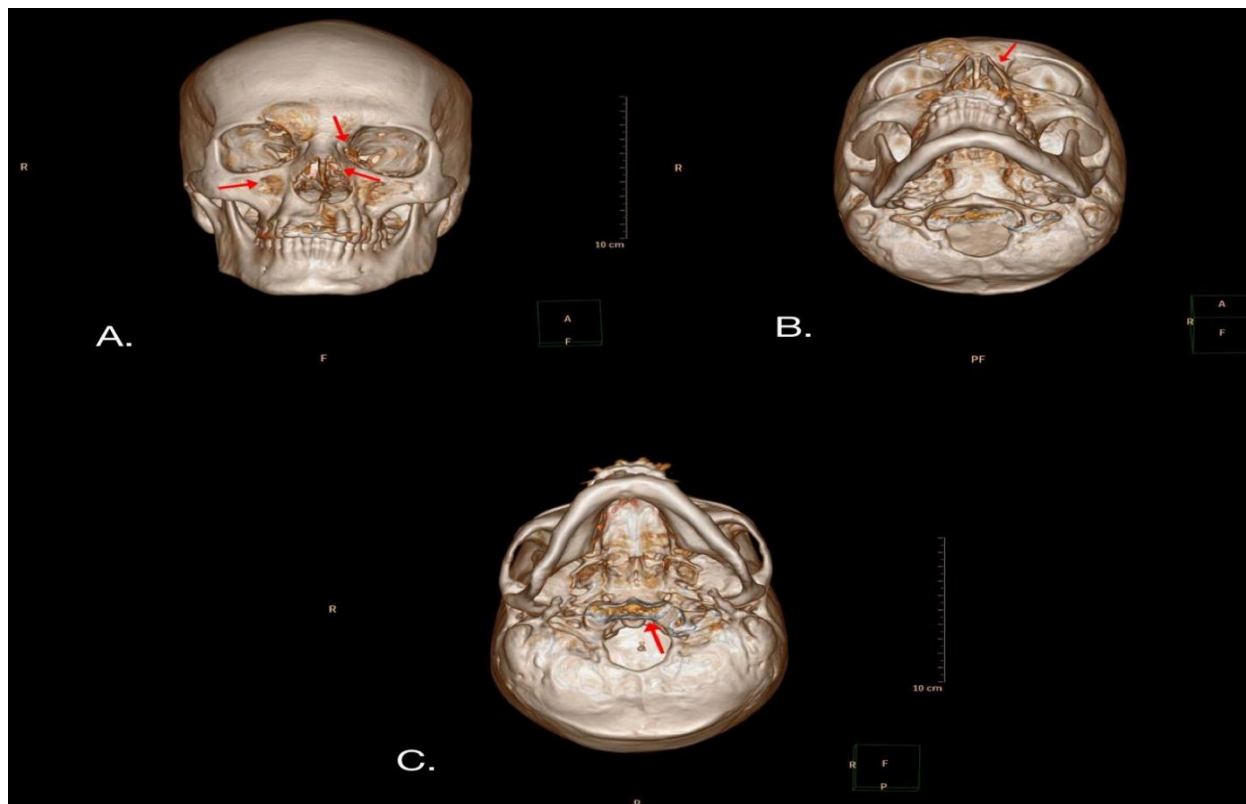


Figure 3 : FACE CT - 3D VIEW OF PARANASAL SINUS

- A. The red arrows show mucosal thickening in the bilateral maxillary, left ethmoidal and frontal sinuses.
- B. The red arrow shows a widening of the left osteomeatal unit with non-visualization of the middle, superior turbinates and uncinete process- post-operative changes
- C. The red arrows show mucosal thickening in the sphenoid sinus on the left side.



Discussion:

Mucormycosis is an uncommon infection, but sporadic cases and small outbreaks have been inscribed all over the globe. Lately, in India, there has been a dramatic surge of mucormycosis in post-Covid 19 patients. The incidence rate of mucormycosis in the Indian population is 0.14 per 1000, which is 80 times higher than the global incidence rate [4]. The pathogen enters the individual as spores and metamorphoses into hyphae, solely in patients with risk factors like uncontrolled diabetes mellitus, Immunosuppressive drugs, lymphopenia, IL-6 inhibitors, malignancies, organ transplantation, and predispose to death [5]. The spectrum of Mucormycosis can extend from pan sinusitis to orbital and intracranial extensions, which can lead to a poor prognosis. In severe COVID-19 infection, it has been discerned that lymphocytes progressively decline, and infection usually affects CD4 and CD8 T cells, which play a role in the pathogenesis of COVID-19 infection in addition to uncontrolled sugar levels [6].

The blend of corticosteroid therapy and diabetes constitutes the perfect storm in which mucormycosis originates and prospers. In a context where steroids have become life-saving drugs, and there is an undeniable certainty that one can misuse them, we should individually focus on the stern sustenance of blood sugar levels in patients. Steroids are a double-edged sword, so they must be used judiciously only in patients with moderate and severe SARS-CoV infection [7]. Prevailing symptoms of Mucormycosis are dental pain, stuffy nose, poor smell, nasal discharge with bleeding, facial paresthesia, palsy headache, sinus tenderness, eyelid oedema, orbital pain, eyelid ptosis, protruding eyes, ocular motility restrictions, double vision, and sudden vision loss. Our case demonstrates a resurgence of Mucormycosis after one month of FESS surgery. We want to highlight here the possible causes of re-emergence. They could be improper therapy and follow-up, extensive usage of immunosuppressive drugs; minimal compliance with medications; and a miniature focus on raising patients' immunity.

Our patient, fortunately, presented a little ahead, and his imaging revealed mucosal thickening, so it was beneficial with a repeat FESS. Any involvement of bony structures would necessitate open surgery. This could have happened if our patient was unaware or

inattentive towards his symptoms and dawdled his presentation [8]. As diabetes mellitus produces a complimentary environment for Mucor, they need a proactive approach during their initial presentation as they have tremendous possibilities of recurrence. Despite treatment in Panneerselvam K et al., Mucor had reemerged and led to an extensive resection due to unrestricted involvement the second time. We need to inflate the perception of this mortifying menace among the public and doctors [8].

We are presenting this case so that even post-Covid and Mucormycosis patients should be stringent regarding their treatment and regular follow-ups as everyone globally has confronted the lethal pathogen for the first time, so it is imperative for us to battle it with the most propitious treatment possible. We seek to maximize physicians' understanding of these concerns and highlight the requirement to interpret the open-ended pandemic competently.

Conclusions:

The role of diabetes mellitus and corticosteroids have been proven to be the risk factors associated with mucormycosis. The use of corticosteroids must be done meticulously in view of the rising mucormycosis cases associated with Covid 19 infection and used in times of necessity only. It has been brought to notice that extensive use of immunosuppressive drugs leads to the re-emergence of mucormycosis. Regular follow-ups with precautionary behaviour towards treatment lead to decreased infection rates of Mucormycosis in SARS CoV patients.

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