

Mucormycosis Occurrences, a Common and Frequent Observation in COVID Era: A Case Report

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Abstract

Patients with COVID-19 (Corona Virus Disease-19) might present higher susceptibility to fungal coinfections. Mucormycosis is a rare and often life-threatening fungal disease characterized by vascular invasion by hyphae, resulting in thrombosis and necrosis. This is the case report of mucormycosis in a 58-year-old COVID-19 patient. COVID-19 itself leads to a certain amount of immunosuppression, but the condition further worsened as the patient had long standing HIV (Human Immuno-deficiency virus)/AIDS (Auto Immune Deficiency Syndrome) and Diabetes Mellitus. Over the course of treatment patient developed signs and symptoms of maxillary sinusitis and orbital cellulitis. CT (Computed Tomography) scan of the paranasal sinuses revealed findings suggestive of right maxillary sinusitis. Then after, nasal-biopsy and Potassium Hydroxide (KOH) mount preparation of the nasal-tissue was carried out which confirmed the presence of mucormycosis. Although surgical debridement is the best choice, it was not possible due to the severely morbid condition of the patient. Hence, intravenous Amphotericin-B was given along with other supportive care but ultimately, the patient died.

Keywords: Mucormycosis; Rhino-orbital; COVID-19; HIV; Amphotericin-B

Introduction

The coronavirus disease 2019 (COVID-19) infection may be associated with a wide range of disease patterns, ranging from mild to life-threatening pneumonia. A complex integration of various factors, including preexisting diseases (such as diabetes mellitus), previous respiratory pathology, use of immunosuppressive therapy, Immunocompromised state (HIV/AIDS, Cancer), underlying renal or hepatic condition and apart from these, systemic immune alterations of COVID-19 infection itself may lead to secondary infections. A wide range of bacterial and fungal co-infections may exist which are increasingly being recognized in view of their impact on morbidity and mortality [1].

It has been reported that patients with COVID-19 might be at risk of developing invasive fungal infections, such as invasive aspergillosis, Mucormycosis, candidiasis and *Pneumocystis jiroveci* infection [2].

Mucormycosis is rare opportunistic fungal infection. It belongs to the order Mucorales which comprises of numerous genera. *Rhizopus* is the most common genus associated with mucormycosis, followed by *Mucor* and *Lichtheimia*. It exhibits a remarkable propensity to

invade vasculature by hyphae, leading to thrombosis, angioinvasion, necrosis and infarction of tissue. Further, interaction with host endothelial cell receptors may promote endothelial cell damage and fungal spread and mortality is high [3].

The most common clinical presentation is rhino-orbital-cerebral infection, believed to be secondary to inhalation of spores into the paranasal sinuses of a susceptible host. Apart from this it can also occur at pulmonary, gastrointestinal and cutaneous sites. The clinical presentation of mucormycosis varies according to its location [4].

Herein, we report the case of a patient with COVID-19 infection with long-standing underlying conditions like Diabetes mellitus and HIV/AIDS who developed mucormycosis during the course of the treatment.

Case Details

A 58-year-old male patient was admitted to the hospital since a month with a two-day history of cough, pyrexia and breathlessness; where he tested positive for COVID-19 by RTPCR (Reverse Transcriptase Polymerase Chain Reaction). He was a known case of HIV for the past 10 years, Type-2 Diabetes Mellitus since 6 years, Hypertension and Ischemic Heart Disease (with severe Left Ventricular Deviation) since 4 years and was taking medications for all these conditions. Patient also had a past history of Fanconi Syndrome with Tenofovir. His vitals on admission were: Temperature: 100.0°F, Pulse: 110/min, Blood-pressure: 200/106 mmHg, SpO₂: 95% on Room Air.

He was put on Oxygen therapy with NRBM (Non-Re-Breather Mask) and CT scan of the chest was done which showed multiple ground glass opacities with smooth septal thickening noted in both lungs with crazy paving appearance. And the CT severity index (CTSI) was 17/25. Patient received Inj. Remdesivir (100 mg IV (intravenously) for 5 days was started along with that Inj. Meropenem (1 gm IV) for 15 days, Inj. Methylprednisolone (40 mg IV) for 10 days and Inj. Enoxaparin (40 mg IV) for 8 days.

Suddenly, after about 20 days of admission, patient developed Nasal blockage, headache, periorbital swelling and red eye. Following which CT scan of the Para-nasal sinuses was done which was suggestive of right maxillary sinusitis (Figure 1). Right orbital was also invaded by the fungus (Figure 2). Other relevant CT scan findings are also shown in figure 3. Right-side nasal biopsy was done which shows dense mixed infiltration of the nasal mucosa along with some broad aseptate fungi, it morphologically resembled Mucor Species. For further confirmation, KOH mount preparation of the nasal tissue was done which revealed few thick, broad, ribbon like hyphae resembling Mucormycosis species.

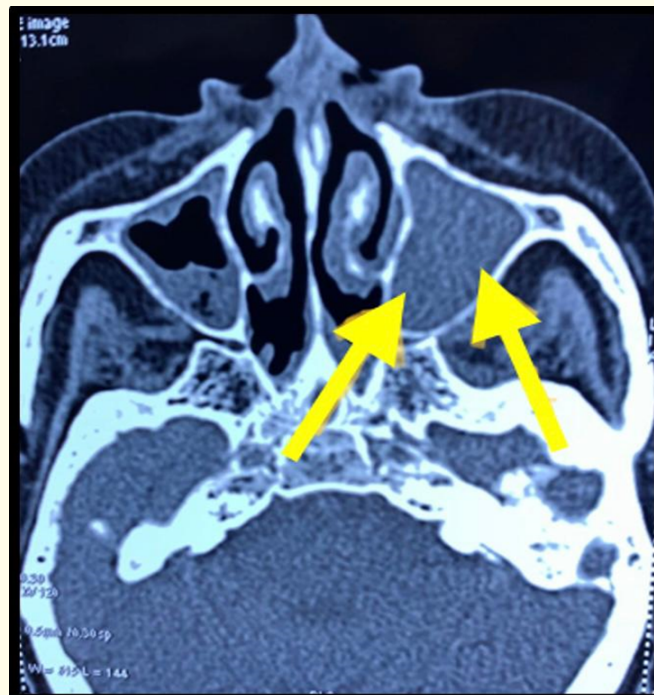


Figure 1: Maxillary sinus involvement.



Figure 2: Right orbital involvement.

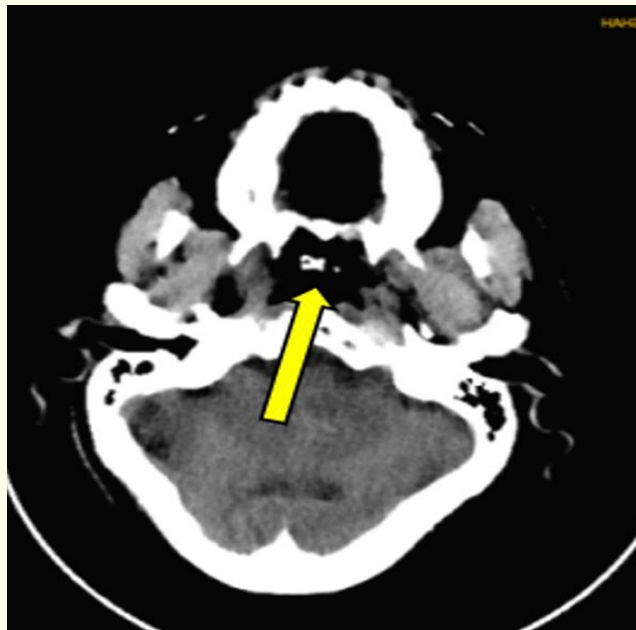


Figure 3: Other CT scan findings.

On 25th day patient tested negative for COVID-19 but the CTSI was still 12/25. He developed Hypoglycemia two times that day, he was on supportive treatment and Inj. Amphotericin-B (50 mg/10 mL IV). On 27th day Ryle’s tube (RT) was inserted. Conventional Amphotericin-B was added. Other drugs given included Tablet Sulfamethoxazole/Trimethoprim (800 mg/160 mg) through RT, Inj. Cefoperazone/Sulbactam (1000 mg/500 mg) IV, Inj. Enoxaparin (0.6 mg subcutaneously) and Inj. Ondansetron (4 mg IV). On 31st day patient started gasping and was not maintaining saturation on BIPAP (Bilevel Positive Airway Pressure). He had SpO₂: 50% on 100% FiO₂ and RR: > 40/min. Therefore, patient was urgently intubated under laryngoscopic guidance. Then-after continuous infusion of Inj. Atracurium (25 mg/2.5 ml) and Inj. Midazolam (10 ml) was started along with Inj. Nor-epinephrine (2 mg).

Some relevant laboratory findings included Hb: 10.5 gm/dl (12 - 18), raised Erythrocyte Sedimentation Rate (ESR): 109 mm/hour (0 - 15), C-Reactive Protein: 141.87 mg/L (≥ 5: Positive), S (Serum). Ferritin: 536.6 ng/mL (10 - 282), IL-6: 191.4 pg/mL (0 - 4.4), S.LDH: 347 U/L (100 - 250). Thus, showing a remarkable increase in the inflammatory markers. Other findings included high HBA1C: 9% (5.7 - 6.4), elevated S. Acetone: 20 mg/dL (0 - 10) and blood Urea: 62.7 mg/dL (15 - 45). S. HIV (I and II) test showed a value of 1192.34 (≥ 1.0: Positive).

Usually for the treatment of mucormycosis, Amphotericin-B therapy is more effective with Debridement procedures but due to the general morbid condition of the patient, his relatives didn’t give consent for the same. Henceforth, he was continued on supportive therapy and ultimately patient died.

Discussion

Patients with severe COVID-19 usually have alterations in their immune system with markedly higher levels of inflammatory cytokines (such as interleukin [IL]-2R, IL-6, IL-10 and tumor necrosis factor-alpha), associated with impaired cell-mediated immune response, affecting T- lymphocytes, particularly CD4+ T and CD8+ T cells. In the above-mentioned case, the worsening of this condition was further aided by HIV/AIDS. Which increased susceptibility to opportunistic fungal coinfection [2] (Table 1).

1. Diabetes mellitus
2. Hematologic malignancy with neutropenia or graft versus host disease
3. Organ transplantation (hematopoietic stem cell transplantation more common)
4. Human immunodeficiency virus
5. Autoimmune disorders
6. Immunosuppressive therapy
7. Steroid use
8. Iron overload
9. Burns, Trauma including surgery
10. Peritoneal dialysis
11. Malnutritional states

Table 1: Risk factors for mucormycosis.

As mentioned in table 1 there are various risk factors for the disease. Out of which Diabetics with ketoacidosis are prone to develop the rhino-cerebral form of mucormycosis. The most common initial site of involvement is the sinuses, but spread to the orbit, bone, and brain may occur [3]. The case described here shows rhino-orbital type of mucormycosis due to its involvement in the maxillary sinus and Orbit.

Spectrum of mucormycosis ranges from cutaneous, rhino-orbital/rhino-cerebral and sinopulmonary to disseminated. Rhino-cerebral/Rhino-orbital mucormycosis found is predominantly associated in patients with poorly controlled diabetes mellitus [5]. Additionally, the use of steroids, broad-spectrum antibiotics as part of the armamentarium against COVID-19 lead to the development or exacerbation of preexisting fungal diseases [1].

There are two systemic antifungal therapies currently available with good activity toward mucormycosis: amphotericin-B and Triazole Posaconazole. However, Surgical debridement is strongly recommended to be combined with antifungal therapy in patient with mucormycosis. Although, in this case, looking at his morbid condition, the surgical debridement was not an option. Henceforth, he was only treated with systemic antifungal therapy of Amphotericin-B and other palliative care [5].

Conclusion

SARS-CoV-2 infection is regarded as a cause of severe immunosuppression that might compromise the host response and increase the risk to develop opportunistic infections, leading to higher risk of negative outcomes. We need very high index of suspicion in diabetics patients who are recovering from COVID for sinusitis like symptoms and peri-orbital edema and pain. Each and every case with such findings should be thoroughly investigated for invasive fungal infection. Because early diagnose and early intervention can prevent mortality which is as high as 50% in such cases.

Conflict of Interest

Nil.

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