



COVID ASSOCIATED MUCORMYCOSIS: A CLINICAL STUDY

Ophthalmology

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ABSTRACT

Covid associated mucormycosis (CAM) has become a major health issue in the covid era claiming the vision of many people. In our study conducted on 154 covid associated mucormycosis cases at our hospital from May 2021 to September 2021, we have studied its clinico epidemiological profile, identified the risk factors that might explain the burden of the disease, compared cases which were diagnosed with mucor mycosis during active covid infection with those affected post covid infection and studied the orbital involvement of various cases. It was found that patients with diabetes and those on corticosteroid usage were more predisposed to CAM along with those in immunocompromised state. Orbital involvement was seen in a significant number of cases with loss of vision (PL-ve) in 15% of the cases. Judicial usage of steroids and antibiotics is advisable along with strict control of diabetes to reduce the burden of the disease.

KEYWORDS

Covid-19, Covid associated mucor mycosis, Amphotericin B

INTRODUCTION

COVID 19 pandemic is a major health concern worldwide. COVID-19 has a wide range of symptoms, from mild (flu-like symptoms) to life-threatening pneumonia with multiorgan involvement. Systemic steroids have been demonstrated to improve survival rates. On the other hand, excessive glucocorticoid use has been linked to secondary bacterial and fungal infections. Pre existing morbidities such as poorly controlled diabetes, lung illnesses, cancer, and the immunocompromised state may also contribute to the higher frequency of secondary infections. In the early stages of the pandemic, fungal infections accounted for fewer than 1% of secondary infections. In COVID-19, bacterial infections are the most common cause of secondary infection, but recent reports in India are suggestive of an increase in systemic fungal infections, particularly invasive mould, have sparked widespread alarm. Invasive fungus infections are hypothesised to be caused by a combination of impaired innate defence mechanisms, such as ciliary clearance, and a lack of appropriate lymphatic immune response to fungal invasion. In fact, prolonged corticosteroid treatment for COVID-19 to lower mortality risk likely makes critically ill patients more susceptible to opportunistic infections. Specially, COVID-19-associated mucor mycosis, an opportunistic fungus that infects the rhinal, occipital, and cerebral areas, has been discovered as the pandemic progressed. Nearly 0.14 cases of mucormycosis per 1000 people are seen in India, which is about 80 times higher than the frequency in developed nations.¹ Mucormycosis is caused by the fungus, Mucor (class phycomycetes, order Mucorales), which has the ability to distribute its spores into craniofacial compartments such as the paranasal sinuses, throat, orbits, and intracranial cavity. As a result, the invasion is highly deadly and rapidly progressing, necessitating a multidisciplinary approach and quick treatment.

Mucormycosis can affect the eyes in a variety of ways, from minor lid edema to severe central retinal artery blockage that can impair vision.²⁻⁴ Nasal stuffiness, mucoid, purulent, red, or black nasal discharge, epistaxis, facial, nasal, or periocular oedema and discolouration, speech problems, visual impairment, and agonising headache are all signs and symptoms of mucor-derived angioinvasion. Conditions such as diabetes mellitus, corticosteroid use and immunosuppression, immunodeficiency, malignancies (particularly hematologic), and cell/tissue/organ transplant treatments were found to be predisposing factors.⁵⁻⁷ COVID-19, on the other hand, which necessitates a multi-organ-based treatment in varied degrees of severity, has sadly been added to the list of risk factors for opportunistic Mucor infection. In this study , we have analysed mucormycosis developed in patients with Covid-19.

MATERIAL AND METHODS

A retrospective study was conducted on 154 covid associated mucormycosis cases from May 2021 to September 2021. Information

was gathered regarding COVID-19 treatment procedures, comorbidities, glycemic control, and other factors. The study analysed demographics, risk factors, clinical aspects, diagnostic methods, therapy, and outcome. Biopsy acquired during debridement or nasal swab taken during diagnostic nasal endoscopy were used for potassium hydroxide (KOH) wet mount and fungal culture/sensitivity. Case reports that lacked clinical and laboratory features were excluded.

RESULTS

Over the course of five months, 154 individuals with COVID-19 RTPCR positive were diagnosed with mucormycosis. Out of the 154 patients, 38 had rhino-orbital involvement, 8 had rhino-cerebral involvement, 102 solely had paranasal sinus involvement, and 6 had pulmonary involvement. The participants ranged in age from 24 to 72 years old. 79 percent of the participants were men. In 96 percent of reported cases, at least one risk factor was identified. Diabetes was the most prevalent comorbidity, followed by hypertension. Obesity was discovered in 25 patients. 6 patients had leukemia and history of organ transplantation was present for one individual. The use of corticosteroids for COVID-19 was noted in 107 individuals. The doses, on the other hand, were not well defined. Mucormycosis developed during COVID-19 infection in 60%, while it developed in post-COVID-19 period in remaining 40%. Of these, 22 percent had severe covid infection. The diagnosis was proven in 109 cases, and probable in 45 cases. All the cases were sent for surgical debridement of necrotic tissue. A total of 125 patients were treated with intravenous Amphotericin B, majority (65%) of which belonged to active covid group. Remaining patients were treated with oral posaconazole. Orbital involvement was more in active covid group with symptoms such as discharge, retro orbital pain, peri orbital edema, ptosis, total ophthalmoplegia and complete loss of vision. 47 percent of the patients had periorbital edema, 42 percent had proptosis, 24 percent had ophthalmoplegia, and 15 percent had vision impairment. These cases were additionally given retrobulbar injections of Amphotericin B in multiple doses which proved to be beneficial in mild and moderate cases. 22 deaths were reported all being active covid cases.

Sex distribution		
Males	121	78.57%
Females	33	21.42%
Involvement		
Rhino-orbital	38	24.67%
Rhino-cerebral	8	5.19%
Paranasal sinus	102	66.23%
Pulmonary	6	3.89%
Risk factors		
Diabetes	97	63%
Hypertension	27	42%

Diabetes with hypertension	15	24%
Use of corticosteroids	107	69%
Obesity	25	16.23%
Leukemia	6	3.89%
History of organ transplantation	1	0.64%
Ophthalmic signs and symptoms		
Peri orbital edema	72	47%
Proptosis	64	42%
Ophthalmoplegia	36	24%
Vision impairment	23	15%

The below pictures show the effects of retrobulbar amphotericin B combined with intravenous amphotericin



DISCUSSION

Mucormycosis is uncommon in otherwise healthy people, but it can occur in people with predisposing conditions like uncontrolled diabetes (with or without diabetic ketoacidosis), haematological and other malignancies, organ transplantation, prolonged neutropenia, immunosuppressive and corticosteroid use, iron overload or hemochromatosis, deferoxamine therapy, severe burns, acquired immunodeficiency syndrome (AIDS), and others.

Recent evidence suggests that the prevalence of mucormycosis in COVID-19 patients is growing. Apart from the obvious roles of ketoacidosis, high blood sugar levels, iron metabolism, long-term antibiotic use, steroid use, and mechanical ventilation of the host also play a role in the pathophysiology of mucormycosis in COVID-19 patients.

Diabetes mellitus has been associated with severity in Covid-19. Uncontrolled diabetes was the most common underlying illness in both active covid and post covid groups. According to few studies, SARS-CoV-2 has been demonstrated to impact the beta cells of the pancreas, causing metabolic disturbances that could lead to diabetes mellitus.

In the treatment of COVID-19, steroids, particularly glucocorticoids, have been recommended. The majority of the patients in our study had received COVID -19 treatment with steroids, some even before their admission to our hospital. Inappropriate use of steroids was linked to late CAM in a separate study. SARS-CoV-2, like the original SARS-CoV, may produce immunological dysregulation that predisposes the patient to invasive fungal infection. 90.5 percent of individuals with mucormycosis and COVID-19 were given steroids in the current study. 70 percent of individuals with mucormycosis and COVID-19 were given steroids in our study. In addition to diabetics' already high or uncontrolled blood glucose levels, steroid use caused high blood glucose levels in prediabetic and diabetic patients. The severity of COVID-19 was also one of the reasons for excessive mortality in CAM. In our study, 35 mucormycosis patients presented with severe COVID-19, of which 22 (62%) were non survivors, raising the risks of mortality.

Orbital involvement was seen more in active covid group and in diabetics. Prompt, timely treatment cured the symptoms like discharge, pain, oedema. Ptosis could be reversed in 60% of the cases. Whereas, total ophthalmoplegia and complete loss of vision were non-reversible. Prognosis was better in patients who presented within 48 hours of onset of symptoms.

CONCLUSION

According to a recent studies, mucormycosis is becoming more of a problem in the COVID-19 scenario. The majority of the patients are from India, according to reports. Aside from the usual hazards of mucormycosis, such as high rates of uncontrolled diabetes and poor environmental circumstances, the COVID-19 pandemic introduced

new ones, such as steroid use, antibiotic overuse and hypoxia. The mortality rate is significant despite medical and surgical treatment. As a result, clinical recommendations for the use of antibiotics in COVID-19 cases should be implemented. To ameliorate the conditions that encourage the onset of mucormycosis in COVID-19 patients, a multidisciplinary approach is required.

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