

Orbital Decompression Turned Out to be an Eye Saver in COVID-19 Associated Rhino - Orbito Cerebral Mucormycosis - A Case Report

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Abstract: *Mucormycosis is one of the fulminant forms of angioinvasive fungal infection which progresses rapidly usually beginning in the nose and paranasal sinuses following inhalation of fungal spores followed by involvement of orbit and central nervous system later. It is caused by fungi of class zygomycetes, which includes genera Absidia, Mucor, Rhizomucor, and Rhizopus. In India, the incidence of mucormycosis is approximately 140 cases per million populations which is 80 times more than other developed countries. Early diagnosis and prompt treatment of this life - threatening disease greatly reduces the morbidity and mortality in these patients.*

Keywords: Mucormycosis, Orbital decompression, Diabetes mellitus

1. Introduction

Paultauf, in 1885, first described Mucormycosis as a rare, opportunistic fungal infection. ^[1] It forms the third commonest angioinvasive fungal infection following candidiasis and aspergillosis. ^[2] It usually affects the immunocompromised individuals due to altered immunity causing rapid proliferation and deeper invasion of fungal organisms and is rarely seen in apparently healthy individuals.

The various risk factors for mucormycosis are uncontrolled diabetes mellitus, solid organ and haematopoietic malignancies, chronic kidney disease, organ transplant, long - term corticosteroid and immunosuppressive therapy, tuberculosis and AIDS. ^[8] Individuals with compromised defense mechanisms, on inhalation of spores, may spread to the nose and paranasal sinuses and consequently to the orbit, and brain by direct extension. Some patients with mucormycosis have no identifiable risk factors. ^[3] Early identification of the disease and aggressive medical and surgical interventions is absolutely necessary for proper treatment of this disease. We report here with an interesting case of rhinoorbitocerebral mucormycosis in a post COVID-19 diabetic patient and the response to the treatment given which had prevented orbital exenteration.

2. Case Report

A 43 years old male of was referred as a case of Rhino orbito cerebral mucormycosis. Patient, who is a known diabetic and hypertensive for 5 years on oral medications, was tested positive for COVID-19 for which he was admitted in hospital and was discharged after swab tested negative after 10 days. Patient was not on any steroids or oxygen supply during the period of admission. Later, after 5 days of discharge, patient developed headache, nasal stuffiness and blurring of vision in right eye for which he was again admitted in the same hospital. CT and MRI PNS picture showed as invasive fungal sinusitis with orbital involvement and hence patient was started on injection Liposomal Amphotericin B and underwent FESS and sinus debridement. Two doses of Retrobulbar Amphotericin B was given in both eyes. Patient's symptom worsened and was

referred to our hospital for further management. Patient came to our hospital with loss of vision in Right eye and blurring of vision in left eye. Patient also had complaints of loss of eye movements and drooping of eyelid in both eyes.

On examination of Right eye, patient had BCVA of No perception of light, periorbital edema with complete ptosis, conjunctival congestion with chemosis, pupil 4mm not reacting to both direct and indirect light reflex, and total restriction of extraocular movements.

On examination of Left eye, patient had BCVA of 6/9, periorbital edema with mild ptosis, pupil 3mm sluggishly reacting to direct light reflex and ill - sustained reaction to indirect light reflex, extraocular movements showed restriction of abduction, levelevation and levodepression.

Colour vision was normal on the left side. Corneal sensation, supraorbital and infraorbital sensation was intact on both sides.

Fundus examination by indirect ophthalmoscopy showed temporal pallor of right optic disc with RPE changes, and normal fundus in left eye.

KOH mount and culture from nasal mucosa tested positive for Mucormycosis. His HbA1C value was 7.3.

Patient was continued with intravenous Injection Liposomal Amphotericin B, later started on Tablet Posaconazole and Retrobulbar Amphotericin B for a total of 6 doses was given in both eyes.

As patient presented with worsening of symptoms and repeat imaging showed bilateral pansinusitis with bilateral orbital extension involving orbital apex of both sides, patient comes under ROCM Stage 3D ^[8]. According to staging, orbital exenteration is the modality of treatment. But as patient was not willing for orbital exenteration, we did repeat FESS with endoscopic debridement, sinus wash with Amphotericin B and Orbital decompression on both sides.

Intraoperatively, nasal cavity had blackish necrotic debris noted over inferior turbinate in right side which was sent for HPE and came out to be positive for mucormycosis, right

uncinectomy and right MMA was done, mucopus was noted in right maxillary sinus, right anterior and posterior ethmoidectomy was done. Right lamina papyraceae was found to be eroded and hence removed; small incision was made in right periorbita.

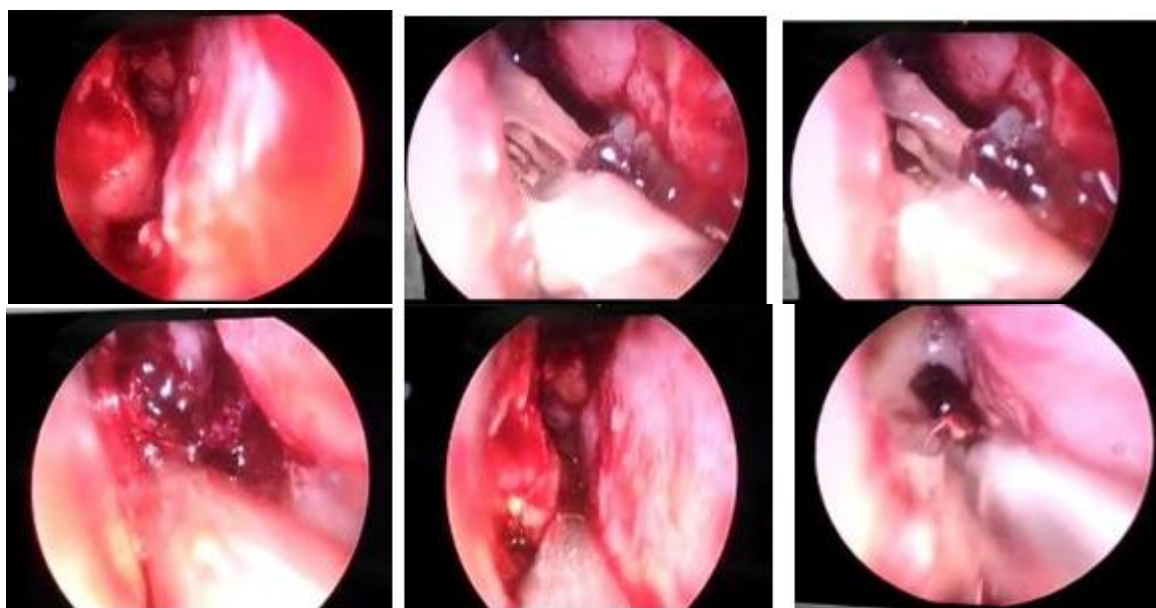
Left uncinectomy and left MMA was done, mucopus was noted in left maxillary sinus, left anterior and posterior ethmoidectomy was done. Left lamina papyraceae was removed and orbital decompression was done.

Patient showed improvement of symptoms after the surgery and the left eye vision improved to 6/6 on discharge from hospital. Patient's eye was saved from orbital exenteration. Patient was asked to continue Tablet Posaconazole for three more months.

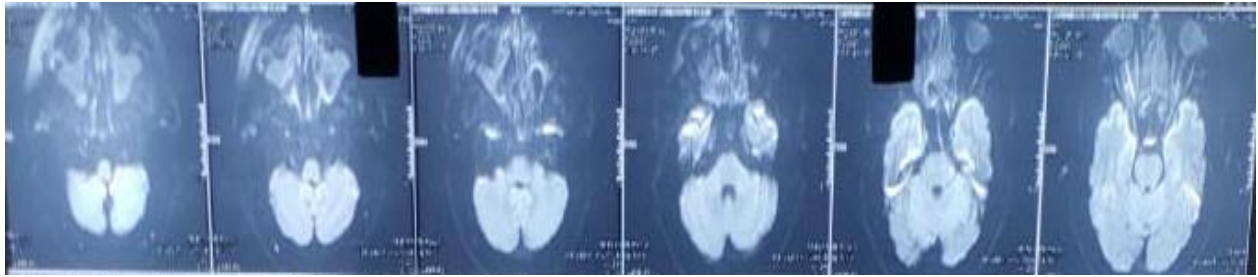
3. Before and After Surgery Pictures



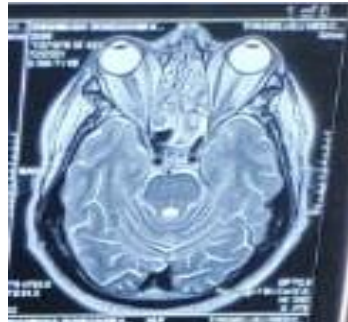
Intraoperative Images of this Patient



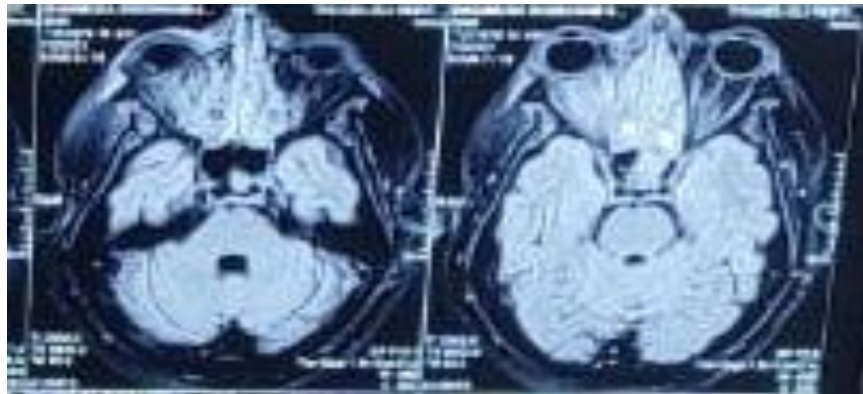
Imaging Showing Enhancement and Thickening of Right Optic Nerve in this Patient



Imaging Showing Thickened Lateral and Medial Rectus of Both Sides with Thickening of Right Optic Nerve in this Patient



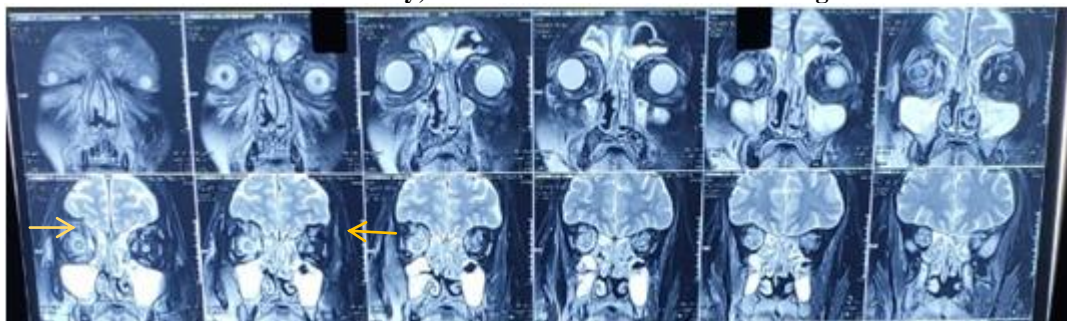
Imaging Showing Right Retro Orbital Mass Involving Orbital Apex

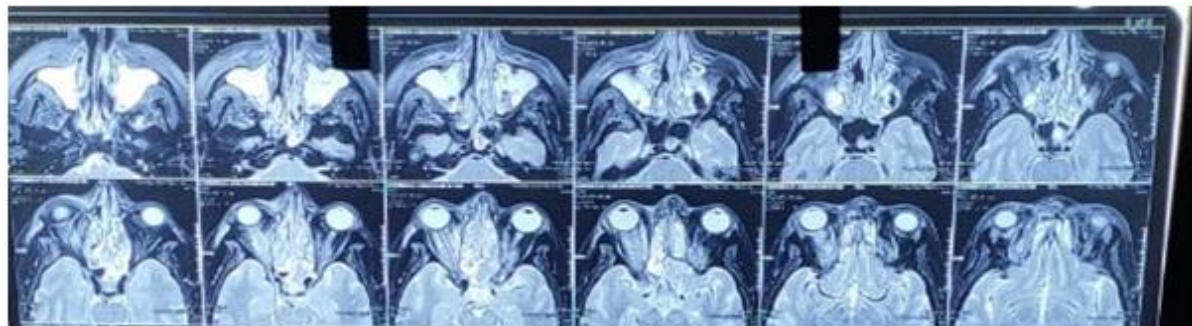


Imaging Showing Involvement of Both Eyes Orbital Apex With Opacification of Maxillary Sinus in this Patient

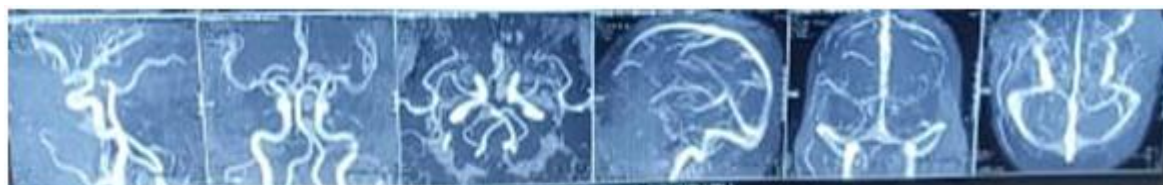


Bilateral Maxillary, Frontal and Ethmoidal Sinus Irregular





Mucosal Thickening with Opacification in this Patient

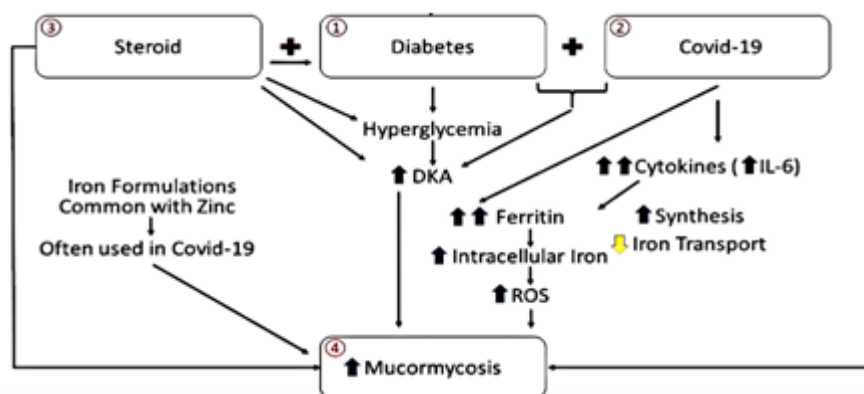


MRA showing Normal Study in this Patient

4. Discussion

Mucormycosis is a class of fungi that produces aseptate hyphae and reproduces both asexually and sexually by formation of zygospores. These fungi which are usually avirulent become pathogenic when the host resistance is low. The airborne tiny spores settle on the oral and nasal

mucosa of immunocompromised individuals followed by germination and development of hyphae which invade arteries, and penetrates into the vessel walls and lumen causing thrombosis, ischemia, and infarction of the affected tissues. Disseminated infection occurs through hematogenous spread to other organs. [4]



Pathogenesis of Mucormycosis in COVID-19:

Common clinical presentations include rhinocerebral, pulmonary, and cutaneous forms and less frequently, gastrointestinal, disseminated, and miscellaneous forms. [5] The rhinocerebral form is the most common form of infection presenting with malaise, headache, nasal stuffiness, facial pain, and swelling and with low - grade fever and is commonly seen in patients with uncontrolled diabetes mellitus. [6]

The disease usually starts in the nasal mucosa, extending to the paranasal sinuses spreading through the surrounding vessels such as angular, lacrimal, and ethmoidal vessels, involving the retro - orbital region by direct extension. [7] Hematogenous spread to other organs such as cerebrum or lungs can be fatal for the patient.

Imaging with CT and MRI with contrast shows opacification of sinuses with patchy effacement of bony walls of sinuses. [8] It also shows the extent of disease and bony erosion

Orbital invasion is seen with thickening of the medial rectus as the first sign. Advanced disease shows patchy enhancement of the orbital fat, superior and inferior orbital fissure and the orbital apex lesion, and bony destruction of the paranasal sinus and orbit. Tissue necrosis causing severe inflammatory edema is seen as optic nerve stretching and tenting of the posterior pole of the eyeball. [8]

MRI and MR angiography shows the extent of cavernous sinus involvement and any ischemic damage to the brain. Comparative imaging over time helps monitor the course of the disease. [8]

Direct microscopy shows aseptate, irregular, ribbon - like hyphae, non - dichotomous branching at right angles and greater hyphal diameter. [8]

On Histopathological examination, broad and aseptate fungal hyphae with branching at right angles is seen. Culture

shows fluffy white, gray or brown cotton candy - like colonies dotted with sporangia brown or black in colour. ^[8]

5. Conclusion

Mucormycosis can occur in patients with varied precipitating factors, the foremost being uncontrolled diabetes mellitus. Early diagnosis of this disease and prompt management of the patient is absolutely necessary for saving life and destructive procedures such as orbital exenteration in these patients as seen in our patient. Hence close monitoring of patient, repeated sinus surgery, retrobulbar Amphotericin B and good metabolic control is essential to save the vision, eye, and life of patient. Multidisciplinary approach is advised.

Declaration of patient consent:

The authors confirm that they have obtained all appropriate patient consent forms for his images and other clinical information for reporting in the journal and that his identity will be concealed with due efforts.

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Conflicts of interest:

There are no conflicts of interest.

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