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PROFILE OF OCULAR INVOLVEMENT IN MYCORMYCOSIS IN COVID 19 PATIENTS

Dr Sri Archana*	Post Graduate Department of Ophthalmology Sri Devaraj Urs Medical College Tamaka ,Kolar: 5630103. *Corresponding Author
Dr Inchara N	Assistant Professor Department of Ophthalmology Sri Devaraj Urs Medical College Tamaka ,Kolar: 5630103.
Dr Anneshi R C	Senior Resident Department of Ophthalmology Sri Devaraj Urs Medical College Tamaka ,Kolar: 5630103.

ABSTRACT

PURPOSE: To identify the different ocular features in patient diagnosed with Rhino-orbital mucormycosis in COVID 19 patients

METHODOLOGY: A hospital based Prospective observational study on all patients who are being diagnosed with with Rhino-orbital mucormycosis within the period of 3 months of this study and comprehensive ophthalmologic examination including best-corrected visual acuity, Fundus examination with 90D and indirect ophthalmoscope to examine the extent of severity and findings were noted.

RESULTS: Out of 50 patients 18 patients were diagnosed COVID – 19 positive and 32 cases were previously diagnosed with COVID -19 among these ,43 cases were known case of type 2 diabetes mellitus. Most common ocular presentation was loss of vision followed by proptosis and frozen orbit

CONCLUSION: There is an increased rate of Rhino-orbital-cerebral mucormycosis cases presenting with various ocular signs and symptoms to our center during the second wave of the COVID-19 pandemic. This is a preliminary report, and further studies are needed to corroborate the findings and explain possible underlying links

KEYWORDS : Mucormycosis, COVID-19, Rhino-orbital-cerebral mucormycosis, frozen orbit, CRAO

INTRODUCTION

Coronavirus disease 2019 (COVID-19) is a disease entity caused by a novel coronavirus(SARS-CoV-2) has caused a worldwide pandemic.

The world is currently going throw a dramatic disruption of life due to rapid progression of the COVID-19 pandemic.

During the current pandemic of COVID-19, a myriad of manifestations and complications has emerged and are being reported. COVID-19 disease has been seen to have a multi systemic involvement, commonly presenting as a lower respiratory tract infection .It was seen that patients with COVID-19 are at increased risk of acute cardiac injury, heart failures, arrythmias, thromboembolic complications (pulmonary embolism and acute stroke), and secondary infection.[1] As a surprise it was noted mucormycosis which was a rare entity in India is now emerging as front runner among the complications in COVID-19 and Post COVID-19 patients.

Rhino-orbito-cerebral mucormycosis is an uncommon infection caused by the angiotropic fungus belonging to the order Mucorales. It is characterized by infarction and necrosis of host tissues that results from invasion of the vasculature by hyphae. The most common clinical presentation of mucormycosis is rhino-orbital-cerebral infection, believed to be secondary to inhalation of spores into the paranasal sinuses of a susceptible host[2]. Predisposing situations for mucormycosis include diabetes, corticosteroid use, neutropenia, malignancies, stem cell transplant, and immunocompromised individuals[3].

Infection usually presents with acute sinusitis, fever, nasal congestion, purulent nasal discharge and headache. All the sinuses become involved, and contiguous spread to adjacent structures such as the palate, orbit, and brain results in clinical symptoms[1].

Fungus invades paranasal sinus mucosa spreads to the retro-orbital region via the ethmoid sinus through the lamina papyracea or it may spread directly to the orbital apex Orbital involvement of mucormycosis may range from mild to severe life threatening ocular manifestations ranging from mild conjunctival congestion to vision threatening central retinal artery occlusion and life threatening cerebral extension[2,3,4] it has also been seen to be associated with periorbital swelling, blurring of vision, chemosis, proptosis, diplopia, ophthalmoplegia, orbital compartment syndrome Mucormycosis are rare, time sensitive conditions that must be recognized and treated promptly to avoid mortality and morbidity.[5] Since it is a rare entity in India with severe complications like vision loss and intracranial extension which may lead to death among COVID and post COVID patients with very few studies based on it we have taken up this study to mainly look for the various ocular manifestions in patients diagnosed with mucormycosis among COVID-19 patients.

OBJECTIVES:

To identify the different ocular features in patient diagnosed with rhino-orbital mucormycosis.

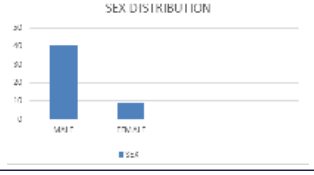
METHODOLOGY:

This is a hospital based Prospective observational study involving total of 50 patients who were visiting Ophthalmology OPD and in-patients of R L Jalappa Hospital attached to Sri Devaraj Urs Medical college who are clinically diagnosed with mucormycosis in COVID and post COVID patients were included in the study. Since there is limited data with good number of cases of mucormycosis we intend to do a time bound study based on all patients who are being diagnosed with with rhino-orbital mucormicosis within the period of 3 months.

After noting the demographic details of the patients, a thorough examination including symptomatology, mode of onset, duration, associated features, and the pattern of presentation were noted. History of patients was carefully noted to determine the presence or absence of risk factors such as history of COVID 19 infection, duration of hospital admission, history of steroid administration (oral, inhalational, intravenous), oxygen therapy, diabetes mellitus, history of radiation therapy or hospital admission. All subjects underwent comprehensive ophthalmologic examination including best-corrected visual acuity, Fundus examination with 90D and indirect ophthalmoscope to examine the extent of severity. Laboratory investigations performed were complete blood count, fasting blood sugar, urine sugar, ketone bodies, blood urea, and serum creatinine. Diagnosis was based on histopathological examination, and KOH preparation of biopsy specimen from nasal cavity. Computed tomography brain and orbit and magnetic resonance imaging brain and orbit was done wherever necessary.

RESULTS:

Total of 50 patients diagnosed with mucormycosis were examined. Out of which 41(82%) were male and 9(18%) were female, mean age of the patient being 49.36 years.

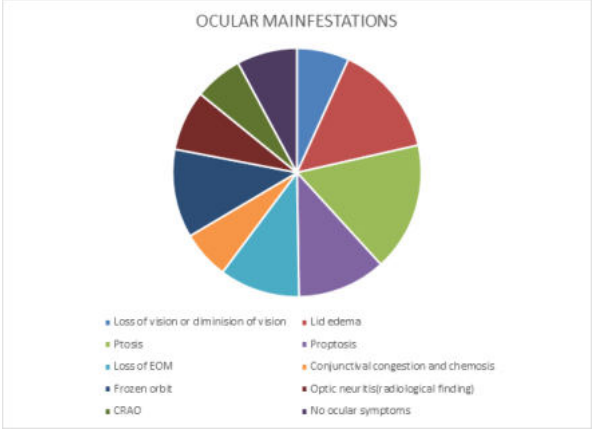


Out of 50 patients 18 patients were currently COVID–19 positive and 32 cases were infected with COVID-19 in the near past. Among these 50 patients 40 cases were known case of Type 2 diabetes mellitus and 3 cases were found to be newly diagnosed with diabetes.

31 patients were found to have undergone treatment with steroid in the form of oral medication among 23 and the remaining with intravenous steroids.

Table 1: Ocular manifestations in patient with rhino-orbital mucormycosis

SL NO	OCULAR MAINFESTATIONS	NO. OF PATIENTS
1	Loss of vision or diminision of vision	13
2	Periorbital edema	28
3	Ptosis	32
4	Proptosis	22
5	Loss of extraocular movement(EOM)	20
6	Conjunctival congestion and chemosis	12
7	Frozen orbit	22
8	Optic neuritis(radiological finding)	15
9	Central retinal artery occlusion (CRAO)	12
10	No ocular symptoms	15



Most common ocular presentation was ptosis followed by periorbital edema. Proptosis and frozen orbit was seen among 22 patient. Followed by loss of extraocular movements in 20 cases and loss of vision in 13 cases and optic neuritis a radiological sign showing thickened and bulky optic nerve was seen in 15 cases. Conjunctival signs and CRAO were seen in 12 cases each. 15 cases had no ocular involvement.

All patients received full dose of intravenous liposomal amphotericin B 5 mg/kg/day. Main modality of treatment was sinus debridement in 40 cases. One case underwent total maxillectomy with excentration surgery.

Figure 1:Extraocular movement restriction with ptosis (EOM)

Figure 2: Left eye chemosis with ptosis and proptosis

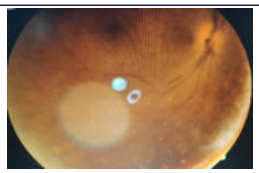


Figure 3: Right eye CRAO

All patients who were admitted received intravenous liposomal amphotericin B of 5 mg/kg/day and was continued until their KOH mount after completion of the therapy tested negative for the fungus. 40 cases out of 50 along with the systemic ampothericin underwent sinus debridement. 1 patient had to undergo orbital excentration surgery and 2 patients had intracranial extension and were referred to neurosurgeons' and 4 patients died due to the complications of mucormycosis and COVID 19

Figure 4: Pre-operative picture showing proptosis with conjunctival chemosis

Figure 5: Intra op maxillectomy with excentration with eye tissue

DISCUSSION:

Mucormycosis is a fungal infections caused by the members of Mucoromycotina (mucormycosis) is a nightmare to many immunocompromised patient and now to COVID and post COVID patients.6,7 Invasion of the fungus to nasal cavity, paranasal sinuses, orbital cavity causing various manifestations and then later on cerebral extension finally causing mortality is the challenge to many surgeons.

In our study orbital involvement of the fungus was most common as it showed and direct extension to orbital cavity and involved the soft tissue of the orbit causing proptosis, lid edema, ptosis, involvement of extraocular muscles causing paralysis leading to frozen orbit, involvement of the ocular-motor nerve causing loss of EOM movements, involvement of optic nerve showed thickened and bulky configuration and associated optic neuritis. Mucormycosis also results in CRAO.1 Thus no sign of ocular involvement should be neglected.

80% of the patients were diagnosed with type 2 diabetes mellitus and this could be an underlying risk factor for the rampant incidence of mucormycosis among the COVID-19 patients. Gumral et al.8 reviewed reports in the Turkish literature between 2000 and 2010 and found that among 79 cases of mucormycosis, the predisposing factor was diabetes in 32 cases

All patients included in the study were non-vaccinated for COVID-19. Future work should attempt to elucidate whether a causal link exists between COVID-19 and Mucormycosis.

CONCLUSION

Mucormycosis is an opportunistic pathogen which was found in COVID and post COVID patients as they were on steroid therapy during the course of the disease and in patient with type 2 diabetes mellitus. Chances of extension of sino-nasal mucormycosis to the orbital cavity is more and cause devastating disease entity making the patient morbid and sometimes even they land up in mortality. Early

diagnosis and treatment of the disease by sinus debridement before it its extension to the orbital cavity can save the eye and even the sight of the patient. Late arrival of the patient to the hospital may lead to difficult in controlling the disease perse.

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