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Original Research Article

Alliance between risk factors and grievousness of mucormycosis in patients suffering from COVID-19

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ABSTRACT

Background: Mucormycosis is a black fungal mold showing a sudden surge in covid era and left as a trail of COVID-19. It wouldn't be wrong to say that both mucormycosis and COVID-19 prey on the immunocompromised by colonizing the nose-sinuses-orbit-eye-brain.
Methods: 30 patients of suspected ROCM were included which presented a gamut of red flags ranging from numbness and pain over the cheek to diminution of vision (DOV) and diplopia. Mucormycosis was confirmed by KOH mount and gadolinium-enhanced MRI. Ophthalmic assessment included visual acuity, IOP measurement, colour vision, extraocular movements, anterior and posterior segment evaluation using slit lamp and fundoscopy.
Results: Risk factors being diabetes mellitus (73.3%), history of oxygen supply during hospital stay (53.3%) and hypertension (53.3%). 16/30 (53.3%) had good vision: <6/6 but >6/12. 11/30 (36.7%) had impaired vision: <6/12 but >6/60. 3/30 (10%) had poor vision: <6/60. Finding being DOV: 14 (46.7%) >chemosis: 10(33.3%) >restricted EOM: 5 (16.7%) >periorbital cellulitis: 4 (13.3%) >congestion: 4 (13.3%) >proptosis: 4 (13.3%).
Conclusions: Thus, as there is a myriad of ocular manifestations, we have tried to portray the whole spectrum here. Patients with the above-mentioned risk factors must be eyed with suspicion since delay in diagnosis and appropriate management can have calamitous implications on patient survival. However, the intervention time varies depending on the various factors like availability of the resources, awareness of the patient and expertise available for diagnosis and treatment. As this disease requires a multidisciplinary approach, ophthalmic intervention should be followed by debridement of sinuses as and when required.

Keywords: COVID-19, Diabetes mellitus, Hypertension, Mucormycosis, Periorbital cellulitis, Steroids

INTRODUCTION

Mucormycosis is a fungal mold which has showed a sudden surge in this covid era. It wouldn't be wrong to say that both mucormycosis and COVID-19 prey on the weak like- diabetics and patients showing severe immunosuppression. The black fungus as it is commonly called is left as a trail of COVID-19. It colonizes the nose, sinuses, orbit, eye and brain. Since all of them are interconnected the spread of the fungus is very fast and furious. We dealt with a number of patients suffering from rhino-orbital-cerebral mucormycosis (ROCM). Due to its angioinvasive and fulminant nature it becomes extremely important to intervene in the golden hour i.e. immediately on diagnosis. As it is an angio-invasive fungal infection, it is associated with high morbidity and mortality.[1] The presentation of patients included a gamut of red flags ranging from numbness and pain over the cheek, chemosis, periorbital cellulitis, congestion, restricted extraocular movements, proptosis, diminution of vision or loss of vision.

Aim

To determine the ocular manifestations in cases of ROCM. To correlate the severity of ocular manifestations with various risk factors i.e. DM, HTN, HIV, cancer, steroids, oxygen therapy.

METHODS

This was a hospital based cross sectional study on patients diagnosed as definite or probable ROCM who presented to the ophthalmology department of Geetanjali Hospital, Udaipur Rajasthan, between April 2021 and November 2021.

Inclusion criteria

Diagnosed patients of ROCM with ocular manifestations.

Exclusion criteria

All suspected ROCM patients who were negative on histopathology or MRI.

30 patients of diagnosed ROCM between the age group 28-80 years were evaluated. Complete ophthalmic evaluation was done. Best-corrected visual acuity (BCVA) was determined using retro illuminated Snellen's chart. Slit lamp examination of the anterior segment and posterior segment evaluation using +90D lens and indirect ophthalmoscope was done. Posterior segment examination was performed after pupillary dilation with 1% tropicamide + phenylephrine eyedrops. Measurement of proptosis using Hertle's exophthalmometer and further evaluation of proptosis was also done. Anterior and posterior segment photographs were taken for records. Intraocular pressure (IOP) and extraocular movements were also recorded. Colour vision was checked using Ishihara chart.

Mucormycosis was later confirmed by KOH mount of the debrided tissues and gadolinium enhanced MRI. The patients with ROCM who sought medical help, were either COVID-19 positive or were in the trail of the same disease. Most of the patients had a positive history for diabetes mellitus, hypertension and had been treated with steroids or had received humified oxygen or both during their hospital stay while they were COVID-19 positive.

RESULTS

A total 30 patients of suspected ROCM were included.

Table 1: Gender distribution.

Gender	Number of cases
Male	16
Female	14

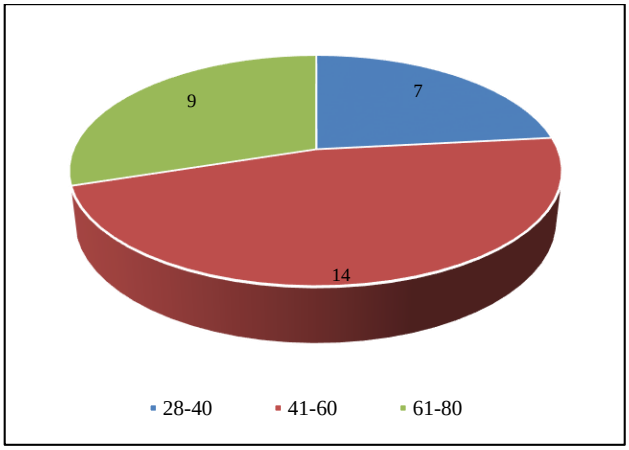

Figure 1: Age group.

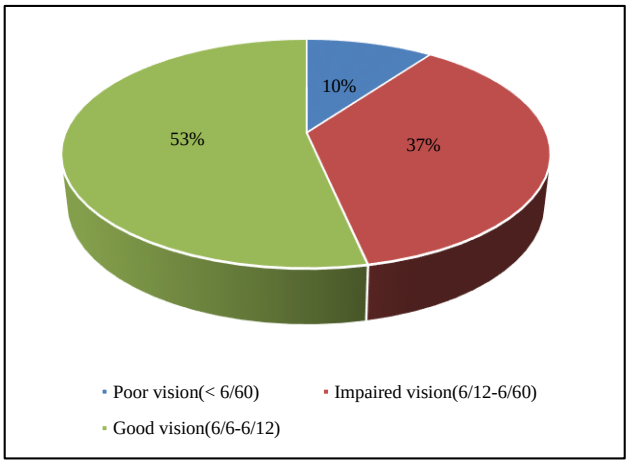

Figure 2: Number of cases.

16 out of 30 patients (53.3%) had good vision i.e. less than 6/6 but more than 6/12.

11 out of 30 patients (36.7%) had impaired vision i.e. less than 6/12 but more than 6/60.

3 out of 30 patients (10%) had poor vision i.e. less than 6/60.

Table 2: Risk factors.

Risk factors	Male (n=16)		Female (n=14)	
	N	%	N	%
DM	14	87.5	8	57.1
HTN	7	43.8	9	64.3
HIV	1	6.3	0	0.0
Cancer	1	6.0	1	7.1
None	1	6.3	2	14.3
Oxygen supply	9	56.3	7	50.0
Steroids	5	31.3	7	50.0
Both oxygen supply and steroids	4	25.0	5	35.7

The most common risk factor was diabetes mellitus (73.3%) followed by those having history of oxygen supply during their hospital stay (53.3%) and hypertension (53.3%).

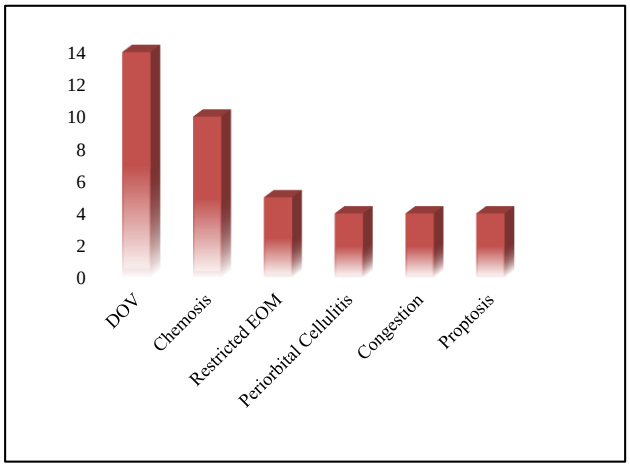

Figure 3: Clinical finding.

Figure 4: A patient having chemosis and DOV (because of corneal edema).

Figure 5: A patient having chemosis.

Figure 6: A patient having periorbital cellulitis.

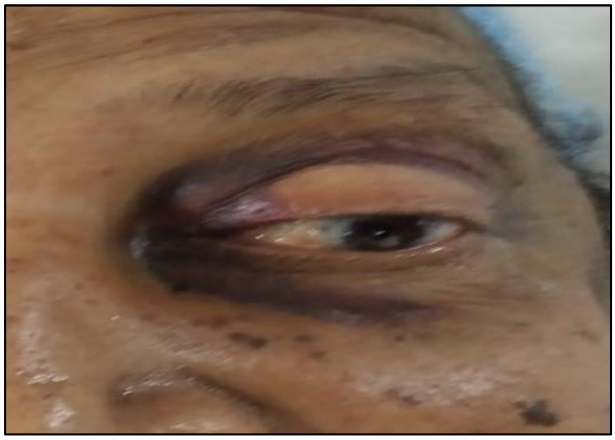

Figure 7: A patient having proptosis.

The most common finding was dimness of vision occurring in 14 patients (46.7%) followed by those having chemosis i.e. 10 (33.3%) >restricted EOM: 5 (16.7%) >periorbital cellulitis: 4 (13.3%) >congestion: 4 (13.3%) >proptosis: 4 (13.3%).

DISCUSSION

We conducted this study in 30 diagnosed patients of rhino orbital cerebral mucormycosis.

Petrikkos et al stated that, chronic corticosteroid-based therapy is a primary risk factor that enhances a patient's susceptibility to mucormycosis by causing defects in macrophages and neutrophils and/or steroid-induced diabetes. Also, type 1, type 2, and secondary diabetes mellitus are all reportedly risk factors for mucormycosis.[2] However, in our study diabetes mellitus was the major risk factor (73.3%) and next in line were those having history of oxygen supply during their hospital stay (53.3%), hypertension (53.3%) and patients on steroid therapy (40.65%).

Our study quite complies with the study of Patel et al, where they took 465 patients stating that, the predisposing factors included diabetes mellitus (342/465,

73.5%), malignancy (42/465, 9.0%) and etc. Diabetes mellitus was the dominant predisposing factor in all forms of mucormycosis.[3]

A lot of patients are ignorant of their diabetic status till they acquire mucormycosis. As uncontrolled diabetes is a common risk factor in all types of mucormycosis, it is significantly associated with ROCM type.[4] Mortality associated with mucormycosis in India is considerably high due to delays in seeking medical attention and diagnosing the disease, and challenges in managing the advanced stage of infection.[4]

The limitation of our study was that we were not able to exclude the other causes of dimness of vision like cataract, glaucoma, etc.

CONCLUSION

Thus, as we see there are a myriad of ocular manifestations and we have tried to portray the whole spectrum here.

Diabetes regardless of duration and blood chemical abnormalities predisposes to mucormycosis, often in the cerebral form. Generalized lowering of resistance due to steroid therapy, HIV and cancer prove to be a menace steering the patients in the clutches of the deadly mucormycosis: the merciless barbarian.

Patients with the above-mentioned risk factors must be eyed with suspicion since delay in diagnosis and appropriate management can have calamitous implications on patient survival. However, the intervention time varies depending on the various factors like availability of the resources, awareness of the patient and expertise available for diagnosis and treatment. As this disease requires a multidisciplinary approach, ophthalmic intervention should be followed by debridement of sinuses as and when required.

The various interventions include i.v. liposomal amphotericin B, retrobulbar injection of liposomal amphotericin B and exenteration when the disease is fulminant.

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Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

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