Section: Ophthalmology

Original Research Article

CAUSES OF VISION LOSS IN MUCORMYCOSIS

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ABSTRACT

Background: Mucormycosis refers to fungal infections caused by members of the Zygomycetes in the order of Mucorales. Rapid progression of invasive Mucormycosis results from its predilection for angioinvasion, which lead to cavernous sinus thrombosis and/or internal carotid artery encasement, cerebral infarctions, mycotic abscesses and aneurysms, and haematogenous dissemination follow tissue necrosis and thrombosis of blood vessels, such as the ophthalmic artery, results in the clinical presentation of proptosis, unilateral painful ophthalmoplegia and rapidly deteriorating vision.[1]

Purpose: The aim of this study is to observe and evaluate the causes of vision loss in Mucormycosis patients.

Materials and Methods: In this study cause of vision loss is assessed by using various entity like vision by Snellen chart and counting fingers, anterior segment examination by pen torch light, posterior segment examination by indirect ophthalmoscopy and MRI.

Results: On examine 294 eyes of the patients the following result were observed, visual acuity was 6/6-6/60 in 43.33%,6/24-6/60 in 18.14%,5/60-3/60 in 12.04%,2/60-HM in 6.11% and PL negative 20.37%. The cause of DOV were corneal haze (due to exposure keratopathy), uveitis, disc oedema, RD, exudative DR, CRAO, optic atrophy, cortical blindness, vitreous haemorrhage, cataract.

Conclusion: Mucormycosis is life threatening infection present with acute sinusoid, nonspecific ophthalmic, or cerebral symptoms but morbidity load can be decreased by early diagnosis and intervention. There were many causes of vision loss in Mucormycosis patient, CRAO was the major cause of vision loss in Mucormycosis concluded by this study.

Keywords: Mucormycosis, Vision loss, Causes, Observe.

INTRODUCTION

Mucormycosis refers to fungal infections caused by members of the Zygomycetes in the order of Mucorales, of which Rhizopus Oryza is the most common human pathogen. Rhino cerebral Mucormycosis (RCM) is the most common clinical presentation, and diabetes mellitus (DM) is the most common risk factor. Other risk factors include immunosuppression, HIV, intravenous drug abuse, haematological malignancies and iron overload.[1] Another contributing factor is the use of antibiotics, also commonly prescribed in patients with COVID-19 to fight secondary infections.2 (NATARAJAN, 2021). Now, alongside with the dramatic surge of COVID-19 in India, the number of cases of Mucormycosis has risen accordingly.[2]

Rapid progression of invasive Mucormycosis results from its predilection for angioinvasion, which lead to cavernous sinus thrombosis and/or internal carotid artery encasement, cerebral infarctions, mycotic abscesses and aneurysms, and haematogenous dissemination follow. Tissue necrosis and thrombosis of blood vessels, such as the ophthalmic artery, results in the clinical presentation of proptosis, unilateral painful ophthalmoplegia and rapidly deteriorating vision.[1]

Orbital apex syndrome, which is a rare condition that stems from invasion and subsequent infarction of the ophthalmic artery and the optic, oculomotor,

trochlear, abducens nerves as well as the ophthalmic branch of the trigeminal nerve. It is characterised by sudden loss of vision, ophthalmoplegia, proptosis, optic atrophy and diplopia.[3]
The diagnosis is confirmed by observing the fungal elements in direct smears and histological sections. Management includes controlling the underlying predisposing factors, prompt administration of systemic antifungal agents and repeated aggressive surgical debridement.[1]

MATERIALS AND METHODS

The aim of this study is to find out the cause of vision loss in mucormycos patients.
It was an observational study carried out from April 2021 to September 2021 in patients admitted under Mucormycosis unit at MYH Hospital, Upgraded department of Ophthalmology, MGM Medical College, Indore (M.P.).
Inclusion Criteria: A diagnosed case of Mucormycosis admitted in M.Y. Hospital proven with histopathology report, who were under treatment for the same with routine blood work up done and documented from the day of admission.
Exclusion Criteria: All those patients who were tested negative in histopathology report.
Inclusion and exclusion criteria were applied and cases were selected falling to fulfilling those criteria. 294 eyes were taken as sample size for the study. Patient particulars were taken and each patient was subjected to visual acuity testing by Snellen's chart followed by thorough clinical history taking, anterior segment examination by pen torch light and fundus examination by indirect ophthalmoscope. MRI findings of all patients were assessed.
All the Characteristics of each patient was collected on excel sheet and analysed on various endpoints and correlations were made between vision loss and fundus findings of the patients.
Following causes of low visual acuity were found: CRAO, Optic disc atrophy, optic neuritis, Vitreous haemorrhage, Exposure keratopathy, RD, Exudative DR, Corneal melting and Uveitis.
Statistical Analysis: Data was entered in Microsoft excel. Continuous data was expressed in terms of mean and SD. Categorical data was expressed in the form of proportions and percentage. Normality of the variables was checked by Wilk-Sharpio test and p value <0.05 was considered as statistically significant.

RESULTS

In this study total 147 patients were taken. The patients age range from 20 to 80 years. The average age was 50 years old.
Out of 147 patients, 105 patients were males and 42 patients were female. Both the eyes were taken in the study therefore sample size (n) = 294.
n=294 Visual acuity was 6/6 - 6/18 in 43.33 %, 6/24 -6/60 in 18.14 %, 5/60 -3/60 in 12.04% ,2/60 – HM in 6.11% and PL negative 20.37 % patients. The causes of diminution were – corneal haze (due to exposure keratopathy), uveitis, cataract, disc oedema, exudative RD, vitreous haemorrhage, diabetic retinopathy, CRAO, optic atrophy, corneal melting, optic neuritis and cortical blindness.

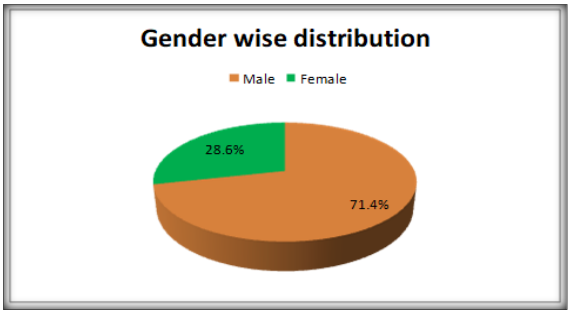


Figure 1: Gender wise distribution

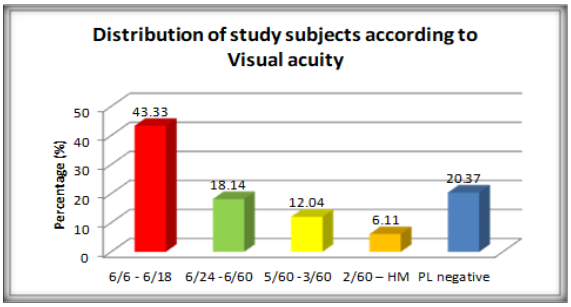


Figure 2: Distribution of study subjects according to Visual acuity

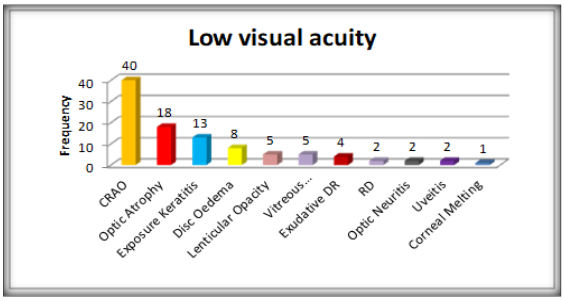


Figure 3: Frequency wise distribution of causes of Low visual acuity

Table 1: Frequency wise distribution of causes of Low visual acuity

Low visual acuity	Frequency
CRAO	40
Optic Atrophy	18
Exposure Keratitis	13
Disc Oedema	8
Lenticular Opacity	5

Vitreous haemorrhage	5
Exudative DR	4
RD	2
Optic Neuritis	2
Uveitis	2
Corneal Melting	1

DISCUSSION

Rhino-orbito-cerebral Mucormycosis (ROCM) is a relatively less common systemic fungal infection. Most of the cases have been reported to occur with poor glycaemic control and diabetic ketoacidosis (DKA).

In this study, 294 eyes were analysed to ascertain the frequency of ocular signs and symptoms. Loss of vision (20.37%), external ophthalmoplegia (20%), ptosis (11%), periorbital oedema (10.73%), ocular pain (10%), proptosis (9.08%), conjunctival chemosis (6%), were found to be ocular presenting feature. Periorbital eschars (0.2%) were found as a rare ocular presentation. Other signs were diplopia/ocular movement restriction, periocular hypesthesia, oral/palatal ulcer/eschar, facial palsy, and altered sensorium. Loss of vision was the most common sign followed by external ophthalmoplegia, ptosis, periorbital oedema, ocular pain and proptosis in this study.

According to the article publish in IJO, the frequency of the most common primary signs of ROCM – periocular/facial edema (33%), loss of vision of (21%), ptosis (12%), proptosis (11%), and nasal discharge (10%). Other signs included nasal ulcer or eschar, diplopia/ocular movement restriction, periocular or facial discoloration, periocular hypesthesia, oral/palatal ulcer/eschar, facial palsy, and altered sensorium. The cumulative incidence of clinical manifestations of ROCM. Loss of vision was the most common sign (63%) followed by periocular or facial oedema (61%) and ptosis (54%). Proptosis was seen in 38%. Mean measured proptosis was 3.1 (range 1–8) mm in 397 patients in whom exophthalmometry measurements were available.[11]

Cavernous sinus thrombosis (CST) with vision loss is characteristic of Mucormycosis while CST without vision loss could be suggestive of bacterial aetiology.[5] Bhansali et al both cavernous sinuses and vision were found normal in their patients. In contrast to this, in this study we got few patients with Cavernous sinus thrombosis (CST) and vision loss, the average is almost (4.8%).[4]

Intraocular invasion is rare and it may occur consequent to intra-arterial spread.[5] Scleral necrosis, peripheral corneal melt, low IOP, lid gangrene and loss of vision in their patient suggest multiple vascular invasions. Loss of vision may be attributed to thrombosis of retinal, choroidal or ophthalmic vessels, disc atrophy, exposure keratopathy due to lagophthalmos, and retinopathy due to poor glycaemic control. In this study major cause of vision loss were CRAO (40%) followed by optic disc atrophy (18%) and other causes are Exposure Keratitis (13%), Disc Oedema (8%), Vitreous haemorrhage (5%), Exudative RD (4%), RD (2%), Optic Neuritis (2%), Uveitis (2%), Corneal Melting (1%) and cortical blindness (5%).

Angioinvasion, greater propensity for arteries than veins, is another characteristic feature which leads to thrombosis & haemorrhage, resulting in tissue infarction and necrosis.[5] In the diagnosis of Mucormycosis, histopathological examination is considered more sensitive than cultures. In our study histopathological examination were taken in consideration and all those who were tested positive were included.

Partial or complete monocular loss of vision may occur in patients with carotid artery disease, usually in the ipsilateral eye. In our study complete monocular loss of vision found in 18.73% and bilateral case were 1.37%.

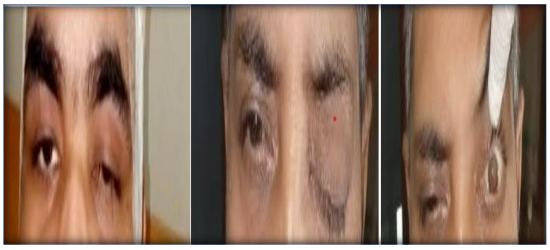
This results most often from a central retinal artery occlusion (CRAO), Central retinal vein occlusion is also the most common ocular vascular occlusion associated with hypercoagulable states.

Funduscopic examination reveals diffusely spread retinal superficial haemorrhages, retinal and macular oedema, dilated and tortuous veins, and optic disc oedema. Cotton-wool spots suggest associated retinal ischemia, indicating a worse visual prognosis. Neovascularization of the retina, optic disc, and iris predisposes the patient to intra vitreous haemorrhage, traction retinal detachment and neovascular glaucoma. In such cases, an embolus may be seen in the affected vessels. Other causes of permanent monocular visual loss in patients with carotid artery disease include venous stasis retinopathy, and the ocular ischemic syndrome.[3]

Patients with a CRAO almost always have extremely poor visual acuity in the affected eye. Acute CRAO is characterized by diffuse pale swelling of the retina, a macular “cherry red” spot, and attenuation of the retinal vessels. Emboli are seen in up to 40% of central retinal artery occlusions.[5,6,7] The most common emboli that occlude retinal arterioles are made of cholesterol, fibrin-platelets, and calcium fragments.

Optic Atrophy

CRAO



CLINICAL PICTURES SHOWING- MODERATE & SEVERE PTOSIS AND FIXED DILATED PUPIL NON REACTING TO LIGHT

B/L ORBITAL OEDEMA WITH LE ESCHAR ON LOWER LID

BE PL NEGATIVE WITH CORNEAL MELTING

RE PROPTOSIS AND PERI-ORBITAL OEDEMA WITH MILD PTOSIS

CONCLUSION

The clinical manifestations of Mucormycosis can vary in patients, the severity of the condition may be related to the immunity and co-morbidities. Sinusoidal, Ophthalmic, and cerebral involvement predominated in the clinical picture. Delay in treatment due to late presentation and associated complications were major determinants of the survival outcome in these patients. There are many causes of vision loss in Mucormycosis patient, CRAO is the major cause of vision loss in Mucormycosis concluded by this study.

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