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Original Research Article

A retrospective analysis of outcomes of rhino-orbito-cerebral mucormycosis at tertiary care hospital

Radhika Bellary[1], Gajanan Channashetti[1], Sharath Babu K.[2], Lavanya S. R.[1], Vaishnavi Suresh Dhage[1]*

[1]Department of Ophthalmology, Gadag Institute of Medical Sciences, Gadag, Karnataka, India
[2]Department of Otorhinolaryngology, Gadag Institute of Medical Sciences, Gadag, Karnataka, India

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***Correspondence:**
Dr. Vaishnavi Suresh Dhage,
E-mail: vaishnavisuresh2801@gmail.com

ABSTRACT

Background: This study aimed to report outcomes of rhino-orbital-cerebral mucormycosis (ROCM) at tertiary care centre.
Methods: Retrospective analysis of in-patients diagnosed to have ROCM during the year 2021 was done. Diagnosis was confirmed based on lab and MRI investigations. Clinical features and management outcomes were noted.
Results: Among 113 suspected cases, 81 were confirmed to have ROCM. Majority of the patients had suffered COVID-19 disease. 67 cases out of 81 underwent maxillectomy with sinus debridement. Among the 67 cases,11 patients had orbital involvement with no PL, orbital exenteration was performed. Among remaining 14 patients, mortality due to cardiac and respiratory illness was seen in 3 patients, 7 went against advice and 4 had CNS involvement. All the patients were treated with liposomal amphotericin-B.
Conclusions: Early diagnosis, surgical intervention followed by amphotericin B in ROCM has favourable outcome. CNS involvement has a high mortality rate.

Keywords: Amphotericin B, COVID-19, Mucormycosis, Rhino orbital

INTRODUCTION

Rhino-orbital cerebral mucormycosis is a rare fungal disease caused by Mucorales. The causative agents belong to the Mucoraceae family, Absidia, Mucor, and Rhizopus which may often be seen in decaying organic matters like food soil and excreta of animals.[1]

When infected it spreads rapidly and thus has high morbidity and mortality. It is often observed with immunocompromised state, like blood dyscrasia, malignancy, diabetes mellitus with poor glycemic control, prolonged corticosteroid therapy, post organ transplantation and in severe debilitating conditions like burns and trauma.[2]

The disease presents often with clinical symptoms resembling facial or orbital cellulitis with rapid progressive clinical course which may end in fatal outcome if not managed properly.[3]

Management of rhino-orbital cerebral mucormycosis is a medical as well as surgical emergency. Reaching an early definite diagnosis is pragmatically challenging, whereas the delay in initiating the treatment will further aggravate the morbidity and mortality.[4]

The objective of this study was to report the outcomes of rhino-orbital-cerebral mucormycosis (ROCM) at tertiary care centre. Just when the nation was recovering from COVID-19 pandemic, an epidemic of mucormycosis began.

It is possible that COVID-19- through molecular mechanisms and other cellular immune factors- creates a favourable environment for mucormycosis.[5] The interplay between the two infections needs to be worked out based on these pathogenetic pathways to prevent invasive fungal disease with high mortality. [6]

METHODS

This was a retrospective observational study carried out in tertiary care centre Gadag Institute of medical sciences, Gadag, Karnataka from April 2021 to December 2021.

Inclusion criteria were all in-patients diagnosed to have ROCM during mucormycosis epidemic irrespective of COVID status between 20-80 years. Patients above 80 years, conditions resembling ROCM like allergic fungal sinusitis, aspergillus sinusitis were excluded from the study.

Informed consent was obtained from the participants. All patients with clinical features suggestive of mucor were confirmed by KOH mount, nasal endoscopy and imaging studies. KOH mount showed, large non septate branching hyphae with mycelia, with positive culture report. Detailed history and complaints of the patient were noted. Patients COVID-19 status was confirmed by RT-PCR of Nasopharyngeal swab confirmed cases of COVID-19 underwent HRCT thorax, CORAD scores were noted. Patients with severe COVID were treated with intravenous steroids and oxygen therapy depending on the requirement.

A thorough ophthalmic examination, including visual acuity, extraocular movements and fundus examination with indirect ophthalmoscopy was done. Imaging studies like magnetic resonance imaging (MRI) or CT scan of brain, orbits and paranasal sinuses with or without contrast was done.

Blood investigations like complete hemogram, random blood sugar, and liver and renal function tests were done. Signs like ophthalmoplegia, decreased vision, and involvement of sinus were closely monitored.

The patients were treated with a team approach consisting of medicine, ENT and ophthalmology departments. Patients with other systemic illnesses like diabetes, hypertension were treated accordingly. Intravenous liposomal amphotericin B was given to all patients with a standard dose of 3 to 5 mg/kg body weight/day. It was started only after confirmed lab diagnosis. When the signs of recovery were seen, oral posaconazole was added in a dose of 5 mg/kg body weight/day. Liposomal amphotericin B and oral posaconazole was given for 4 to 7 days.

Maxillectomy with sinus debridement was done. Debridement of orbital necrotic tissue was done whenever required. Orbital exenteration was done in patients with no light perception, total ophthalmoplegia and necrosis of orbital tissues. MRI and nasal endoscopy were performed to know about disease resolution or progression. Whenever needed, repeat debridement was considered. The patients were followed up for a minimum period of 3 months. Statistical analysis was done using Chi-square test. A p value ≤ 0.05 was taken as significant.

RESULTS

Majority of the patients affected belonged to the age group 41 to 50 years (37%). 79% of the affected patients were males. 62 out of 81 confirmed patients were tested positive for COVID-19 (few of them were in the convalescent phase).

Table 1: Age wise distribution of patients.

Age (years)	Number
20-30	2
31-40	17
41-50	30
51-60	13
61-70	13
71-80	6

Table 2: Sex wise distribution of patients.

Gender	Number
Male	64
Female	17

Table 3: COVID-19 status of patient number.

Status	Number
COVID positive	62
COVID negative	19

Among remaining 14 patients, mortality due to cardiac and respiratory illness was seen in 3 patients,7 went against advice and 4 had CNS involvement 4 patients had CNS involvement, among which one patient had carotid stenosis and one more patient had renal failure as co morbidities.

Table 4: Patients with CNS involvement.

	Number
Cerebral involvement (non-operable)	4

All the patients were confirmed to have mucor based on KOH mount and Imaging tests. The common clinical features were diminution of vision, drooping of eyelid and ophthalmoplegia.

The most common imaging findings were invasive changes in all the sinuses (pansinusitis) and features of orbital cellulitis. Intracranial extension in the form of cerebral involvement was seen in four cases.

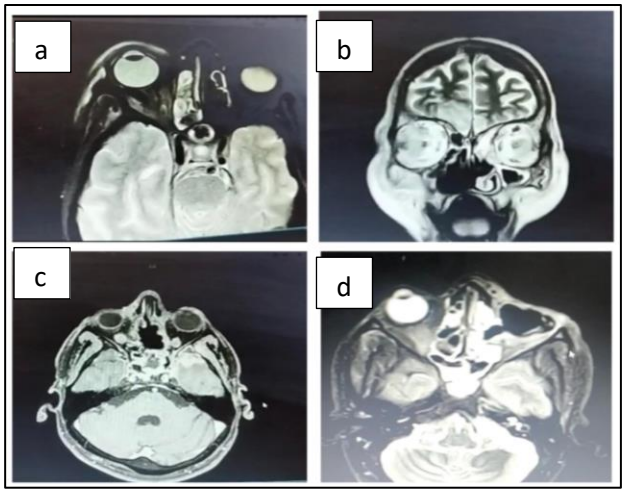

Figure 1 (a-d): MRI shows features of pansinusitis, orbital involvement. Last one showing empty left socket post exenteration requiring revision surgery.

Table 5: Treatment for mucormycosis.

Treatment	Number
I.v. amphotericin B (conservative)	81
Maxillectomy sinus debridement	67
Maxillectomy sinus debridement with exenteration	11

Table 6: Number of patients requiring revision surgery.

	Number
Number of patients requiring revision surgery	24

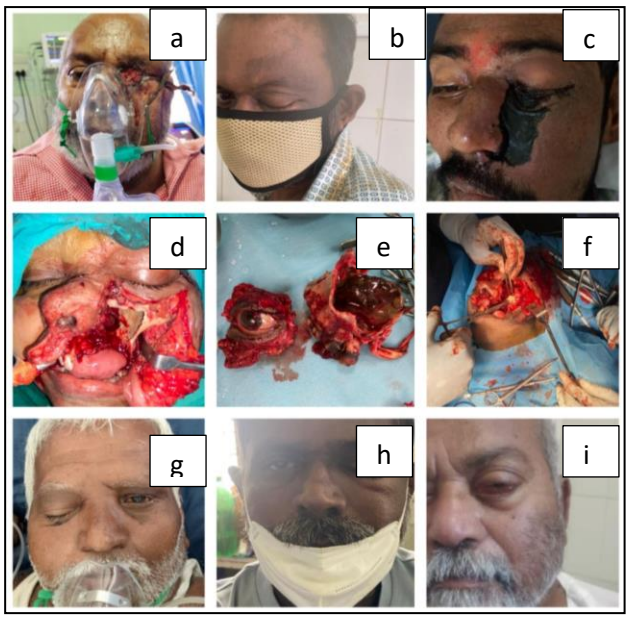

Figure 2 (a-i): Various clinical presentations and maxillary sinus debridement and an exenterated eye ball.

All patients were treated with IV liposomal amphotericin B. Maxillectomy with sinus debridement was done in 67 patients.

11 patients out of 67 had orbital involvement with no PL, exenteration was performed.

DISCUSSION

Rhino-orbital cerebral mucormycosis is an opportunistic fungal infection of the immune-compromised patients. The presenting features that are been described are orbital cellulitis with proptosis, loss of vision, ophthalmoplegia and apical neuropathies.[7]

Prompt diagnosis and early intervention helps to halt the disease progression. For this, a multisystemic approach is needed to save the patient. A team approach comprising of medicine, otorhinolaryngology, pathology, microbiology, radiodiagnosis, and ophthalmology departments was done for patient management.

Laboratory tests and imaging methods helps in diagnosis, debridement of the diseased tissue along with systemic amphotericin B are the mainstay of treatment of mucormycosis.

The present study was done during the COVID-19 pandemic. In our study, majority of the patients were above the age of 40 years. Males (79%) were affected more than females. Patients who had suffered Covid 19 had history of steroid use, and were on oxygen therapy. The correlation between these risk factors and mucormycosis has been reported in few studies.[8,9] Age and gender prevalence were not found to be much significant.

Song et al reported in their study that opportunistic fungal infections were associated with COVID-19 pandemic.[8] They reported that COVID-19 associated with immune-compromised state were more likely to develop fungal coinfection. The presenting features were pain, redness, and periocular swelling. Acute progressive ptosis, ophthalmoplegia, and visual loss subsequently. These findings were similar to our study. Singh et al reported cases of mucormycosis in patients who had suffered COVID-19 or still had the active disease. These findings correlate with the present study.[10] In the study by Patel et al, amphotericin B was the primary therapy (81.9%), and posaconazole was used as a combination therapy in 11.4% individuals.[11] Surgical treatment was performed in 62.2% of the participants. They reported that combined medical and surgical management was associated with better survival. Nithyanandam et al reported that sinus debridement is very important part of management of rhino-orbital cerebral mucormycosis.[12] Ravani et al reported presence of cerebral involvement associated with diabetes had a higher mortality rate.[12] Study period was limited to the duration till the epidemic lasted. However longer study duration and follow up can be carried out to know the survival rate and complications.

CONCLUSION

Early diagnosis, surgical intervention followed by amphotericin B in ROCM has favourable outcome. A high index of suspicion is always required to diagnose the disease at an early stage. Surgical debridement combined with liposomal amphotericin B followed by oral posaconazole are highly effective in combating the disease. Early intervention is very much necessary to stop the disease spread to orbit, thus saving the eye. CNS involvement along with systemic co-morbidities has a high mortality rate.

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Ethical approval: The study was approved by the Institutional Ethics Committee

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