Managing Rhino - cerebral Mucormycosis: Institutional Experience

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ABSTRACT

Introduction

Rhinocerebral mucormycosis is a rapidly progressive life threatening opportunistic fungal disease and usually occurs in individuals with weakened immune system. It is caused by filamentous fungi of Mucorales from class Mucormycotina. After nasal inoculation, it usually spreads to orbit and brain. The common presenting complaints are purulent sinusitis, facial swelling, headache, complaints of vision or palatal ulceration. Despite the many recent advances in the diagnosis and management of mucormycosis, it still carries a high mortality rate.

Materials and methods

Here we present our experience in managing 30 such cases of mucormycosis that presented to our department between June 2016 to June 2018.

Results

All these patients were started on systemic antifungals with or without surgical debridement. The patients were followed up with repeated nasal endoscopies and imaging studies.

Conclusion

Successful treatment of mucormycosis consists of aggressive repeated surgical debridement of necrotic tissue, systemic antifungal therapy and immediate control of underlying systemic diseases. Since there are no clear-cut guidelines, the treatment needs to be individualized on a case to case basis.

Keywords

Mucormycosis; Debridement; Antifungal

Mucormycosis is a spectrum of chronic, subacute and progressive infection caused by fungi of order Mucorales belonging to class of Zygomycetes. It constitutes the 3rd most common invasive fungal infection.[1] In ENT, it can present as sinusitis (pansinusitis, rhino-orbital or rhino-cerebral), facial swelling, headache, complaints of vision or palatal ulceration.[2] The organism is usually found in decaying organic matter and soil.[3] It spreads by inhalation or direct inoculation of the spores into disrupted skin or mucosa. An intact immune system prevents the development of infection. However, in immunocompromised patients having uncontrolled diabetes mellitus, HIV infection, severe burns, hematological malignancies or diseases that require long term immunosuppressants like transplantations and chronic kidney diseases, it can have devastating consequences. Irrespective of the route of infection, the fungal hyphae can invade the blood vessels, causing tissue necrosis and infarction.[4] Rhinocerebral mucormycosis develops upon inhalation of the spores into the nose and paranasal sinuses. The invading fungus may the spread into the surrounding areas either directly or by the hematogenous route.

Mortality rates range from 20-50% for localized diseases and 70-90% for disseminated disease.[5] No clear-cut guideline exists for the treatment. In this article, we present our experience in managing the cases of Rhino-cerebral mucormycosis.

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Materials and Methods

A retrospective analysis of 30 patients diagnosed to have histologically proven mucormycosis admitted and managed in our department from June 2016 to June 2018 was

Table I: Co-morbid conditions

ASSOCIATED CO-MORBID CONDITIONS	NO. OF PATIENTS (%)
DIABETES MELLITUS	24 (80%)
CHRONIC RENAL FAILURE	3 (10%)
HEMATOLOGICAL MALIGNANCY	2 (7%)
PROLONGED STEROID USE (Oral/IV)	1 (3%)

carried out. Presenting signs and symptoms, appropriate radiographic imaging, histopathological findings, and the treatment modality followed were recorded and analyzed.

Results

In this study, 18 patients were males while 12 were females. Most common associated co-morbid condition was found to be uncontrolled diabetes mellitus followed by other conditions weakening the immune system. (Table I)

A record was made for the symptoms for which the patient presented to our department. Nasal discharge and/or obstruction was found to be the presenting complaint in all cases followed by generalized headache, complaints of facial swelling, difficulty in vision and ulceration of the palate. (Table II)

Diagnostic Nasal Endoscopy (DNE) was performed in all the cases. Black necrotic crusts were observed within the nose and/or sinuses. (Fig. 1) These were sent for histopathological examination to look for branched, non-septate hyphae with irregular branching representing mucor fungal invasion.

Radiographic analysis by X-Ray Paranasal Sinuses (PNS) were obtained in select cases. These revealed clouding of multiple sinuses, mucosal thickening and bone erosion. Contrast Enhanced Computed Tomography (CECT) scans of PNS were carried out in all the cases to identify the extent of the disease, better definition of soft tissue invasion, necrosis and early bone erosion and to plan surgical debridement, if needed.

All the patients were started on systemic antifungals.

Table II: Common Presenting Symptoms

PRESENTING SYMPTOMS	NO. OF PATIENTS (%)
NASAL DISCHARGE/ OBSTRUCTION	30 (100%)
HEADACHE	20 (68%)
FACIAL SWELLING	18 (60%)
ORBITAL COMPLAINTS	12 (40%)
PALATAL ULCERATION	3 (10%)

Four patients did not require a surgical debridement in view of very limited extension of the disease. The rest 26 patients underwent surgical debridement and medical management simultaneously.

Amongst antifungals, liposomal amphotericin B (AMB) was started at the dose of 3-5mg/kg/day (average 4.5mg/kg/day). Continuous monitoring of renal function by measuring serum urea and creatinine levels was done and the dosage of the drugs were adjusted accordingly. The average duration of treatment was about 8 weeks. 1 patient had to be started on oral Posaconazole 800 mg/day in two divided doses for 2 weeks after he failed to respond to treatment with liposomal AMB.

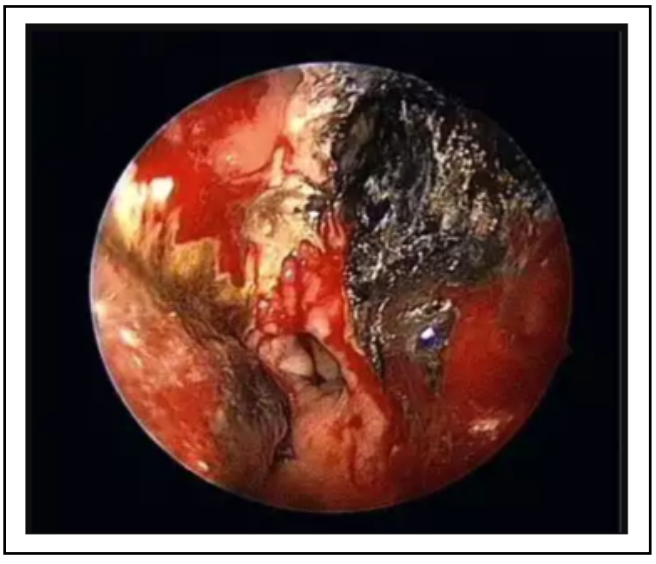

Fig.1. Characteristic black necrotic eschar was observed on nasal turbinate and palate on DNE

Patients were called for regular follow-up once a month for next 6 months and monitored with serial nasal endoscopies. CECT PNS was repeated at the end of 1 month and 3 months to look for any residual or recurrent lesion. All the patients were found to be disease free at the end of 6 months.

Discussion

High incidence of mucormycosis in India is due to increasing numbers of uncontrolled diabetic patients, environmental factors providing optimal set-up for survival of fungi, and improved diagnostic facilities in healthcare centers. Existing data on the management of mucormycosis is not very helpful as there is no standard therapy for its treatment. The treatment needs to be individualized on a case to case basis.[5]

Lipid formulations of AMB are considered the first line therapy of mucormycosis.[6] They are stated on a dosage of 5mg/kg/day intravenously. Higher doses have not been found more efficacious but may need to be given when the central nervous system (CNS) is involved.[7]

Posaconazole is considered as salvage treatment of mucormycosis. As a first line drug, it is considered only in conditions when treatment with amphotericin B is absolutely contraindicated.[7]

Surgical debridement of the necrotic tissue forms the cornerstone of management of mucormycosis. Surgery combined with appropriate systemic antifungal therapy has been shown to increase survival as compared to antifungal therapy alone.[8]

There is no standard duration of treatment and the decision has to be made on an individual basis. The systemic therapy needs to be continued till there is resolution of all clinical and radiological signs and symptoms of infection.

Conclusion

Successful treatment of mucormycosis consists of aggressive repeated surgical debridement of necrotic tissue, systemic antifungal therapy and immediate control of underlying systemic diseases. Due to increase in number of cases, diverse risk factors and inclusion of immunocompetent and immunocompromised patients, there is need of prospective study so that suspected cases can be diagnosed in a timely manner, various risk factors can be analyzed and accordingly patients appropriately treated, which should result in the increase of patient survival.

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