A Case Report of Mucormycosis in a Diabetic Patient and an Approach to its Management in a Tertiary Care Centre of Central India

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Background: Mucormycosis is one of the most rapidly progressing and fulminant forms of fungal infection which usually begins in the nose and paranasal sinuses following inhalation of fungal spores.

Case details: This is a case report of a 65 year old male admitted in our hospital with a long history of Type 2 diabetes with pain and swelling on the right side of nose and signs and symptoms indicating Rhinocerebral-mucormycosis.

Methodology: The level of involvement like the nasal cavity, septum, turbinates, sinuses, palate, orbit involvement, was noted and the protocol of medical and surgical management was decided in accordance to that. Post-surgery KOH mount and HPE report after every debridement, CT and MRI findings were the mainstay.

Conclusion: We here report a case of mucormycosis in a diabetic patient that shows aggressive and alarming mortality, which can be reduced by rapid diagnosis, surgical debridement and administration of drugs like amphotericin B.
In diabetics, the acidic pH produces more free iron by reducing its binding to transferrin which impairs neutrophilic function thus producing suitable conditions for fungal multiplication. Mucormycosis infection in diabetes may result from tooth extraction, intramuscular injections and surgeries. Mucorales have a ketone reductase enzyme, so, they thrive in hyperglycemic and diabetic ketoacidosis states generally associated with poor prognosis.

**Case Report**

A 65 year old male patient, k/c/o diabetes mellitus type 2 and hypertension for 15 years, came to our outpatient department with chief complaints of pain and swelling on the right side of the nose, face and periorbital region for 15 days.

**On Examination**

Face diffuse swelling over the right middle third of face extends from the nose’s lateral aspect to the inner canthus of the eye and right periorbital region with blackish pigmentation near right medial canthus. On palpation, the swelling was soft in consistency, non-tender with no local rise of temperature (Figures 1-4).

**Nasal examination**

Anterior rhinoscopy showed black crusting in right nasal cavity

**Oral cavity**

Black eschar over hard palate.

**Ophthalmic examination**

Right pupil was non-reactive.

**Management**

The general management comprises of radical debridement and excision of the infected tissues with a high-dose therapy of amphotericin B. The first and most important surgical steps following the diagnosis for successful infection management and improved survival rates is an aggressive surgical debridement. The procedure involves the removal of all the necrotic tissue until perfused tissue is encountered. This surgical intervention might be required to be repeated until improvement is observed. In many severe cases, orbital exenteration may be inevitable. In several other severe cases excision of the nasal cartilage and the palate may also be required.

**Investigations**

KOH mount revealed numerous broad aseptate fungal hyphae.

**Histopathology Report**

Broad aseptate obtusely branched fungal hyphae with angioinvasion suggestive of invasive mucormycosis (Figure 5). CT PNS showed swelling in right side of face, soft tissue density with air pockets in right nasal cavity, maxillary, sphenoidal, ethmoidal and frontal sinuses and appears to be infiltrating the inferior wall of right orbit.

MRI brain, orbit and PNS Showed right maxillary, ethmoidal and sphenoidal sinusitis, absorbed right middle and inferior turbinates, inferomedial wall of orbit fuzzy, and findings favor rhino-orbital mucormycosis (Figure 6).

**Surgical Procedure**

Surgical debridement was done by removal of black crusting with microdebrider from right nasal cavity.
and septum then inferior turbinectomy with partial middle turbinectomy, right medial maxillectomy with orbital decompression were done by removing lamina papyracea, preorbital and fat, amphotericin ointment put in right nasal cavity. Endoscopic suction and clearance done in every 2nd day with daily nasal douching with normal saline. Repeated endoscopic debridement was done with local application of amphotericin ointment.

**Treatment**

Inj. Liposomal amphotericin B was started as per dosage 50 mg/kg (6 vials) in 500 mL, 5% dextrose along with Inj imipenem + cilastatin in dosage of 1 gm i/v every 12 hourly, Tab Posaconazole was given as 100 mg every 12 hourly along with supportive treatment. CBC was repeated every 2nd day and daily monitoring of serum sodium, potassium and creatinine was done, daily physician check up was done for raised blood sugar levels and high BP which was being managed simultaneously.

**Discussion**

In this case Provisional diagnosis of mucormycosis of the maxilla was made the differential diagnosis for which includes Neoplasia, aspergillosis, osteomyelitis, chronic granulomatous infection, and deep fungal infections. On lab investigations, elevated blood sugar levels and neutrophilic leucocytosis were found. Rapid, extensive debridement of the whole necrotic tissue was the key for faster healing of this condition and it reduced the fungal load and halted the progression of the disease. Antifungals were empirically started as the disease had a fast progression rate. In general medical treatment of liposomal Amphotericin B has led to a survival rate of upto to 72%. The universal risk factor is diabetes. According to Global guidelines for the diagnosis and management of mucormycosis, any diabetic patient with facial pain, sinusitis, proptosis, or ophthalmoplegia, is at risk of mucormycosis and warrants a CT or MRI of the head. Surgical debridement with clean margins should be achieved in parallel to antifungal treatment. Liposomal amphotericin B is preferred compared to conventional amphotericin B as it is better associated with fever breakthrough fungal infection, less infusion-related toxicity, and less Nephrotoxicity. After infecting the para nasal sinuses, spores spread inferiorly to involve the palate, posteriorly into the sphenoid sinus or cranially to attack the brain. Repeated suction & cleaning is the mainstay for this disease. The middle meatus antrostomy window created is large enough to secure drainage and ventilation of the maxillary sinus, enabling the patient to irrigate the maxillary sinus with a saline solution.

**Conclusion**

The first step in the management of mucormycosis is to have a high index of clinical suspicion, especially in those with diabetes mellitus, COVID-19 and on systemic corticosteroids. Early diagnosis, aggressive surgical debridement, injectable liposomal amphotericin B, topical Amphotericin therapy, control of underlying comorbidities and another supportive measure with close monitoring can remarkably achieve low mortality in patients with sinonasal mucormycosis.

**References**


