Palatal Perforation Resulted by Rhinocerebral Mucormycosis: A Case Report

Guruprasad R, Som Datt Gupta, Arpit Jain

Abstract
Mucormycosis is a rare, opportunistic and potentially lethal fungal infection caused by saprobic organism of the class zygomycetes. Common predisposing factors for this disease include diabetes mellitus and immunosuppression. The most common reported form of the disease is rhinocerebral mucormycosis, which is characterized by progressive fungal invasion of the paranasal sinuses, hard palate, orbit, and brain. The fungus invade the wall of blood vessels, producing thrombosis and ischemia. Oral manifestations can be the early signs of rhinocerebral form. Early diagnosis and management is therefore paramount importance for the survival of the patients. Here we present a case report of 70 year old diabetic male patient who presented with a perforation in the palate, nasal discharge, periorbital cellulitis, and facial pain. Detailed clinical, radiographic, biochemical, histopathological examinations revealed a diagnosis of rhinocerebral mucormycosis.

Key words: Mycoses;Zygomyces;Mucormycosis;Mucorales;Palatal Perforations;Fungal Infections,Rhinocerebral;Fungal Eye Infections.

Introduction
Mucormycosis is the term for infection caused by fungi of the order mucorales.¹ It is also known as zygomycosis or phycymycosis. It is a rare opportunistic infection caused by fungi that are commonly found in soil and among decaying vegetation. Pautaun in 1885 described the first case of this uncommon disease in human beings.² It is an aggressive and often fatal disease which occurs mainly in people with immune disorders, uncontrolled diabetes, malnutrition, and severe burns. It involves the rhino-facial-cranial area, lungs, gastrointestinal tract, skin, and less commonly other organs, but can also present as disseminated form.³ The rhinomaxillary form of the disease is a subdivision of rhinocerebral form.⁴ The infection begins in the nose and paranasal sinuses due to inhalation of fungal spores. The infection can spread to orbital and intracranial structures either by direct invasion or through the blood vessels. The fungus invades the arteries leading to thrombosis that subsequently causes necrosis of hard and soft tissue.⁵ The most common symptoms of rhinomaxillary form include proptosis, loss of vision, nasal discharge, sinusitis, and palatal necrosis.⁶ It mimics malignancies and various other entities like midline lethal granuloma, gumma, Wegener’s granulomatosis, aspergillosis and other systemic mycosis.⁷ So it should be carefully differentiated and managed at the earliest for the better prognosis.

Here we present a case report of 70 year old diabetic male patient who presented with a perforation in the palate, nasal discharge, periorbital cellulitis, and facial pain, which was diagnosed as rhinocerebral mucormycosis after detailed clinical, radiographic, biochemical and histopathological examinations.

Case report
A 70 year old male patient visited to the Department of Oral Medicine and Radiology with the complaint of pain in upper left back teeth and left cheek region since five months. He also complained of pus discharge from left ear and inability to open the left eye since four months; ulcer on left side of palate since 3 months and dark colored nasal discharge since one month. Patient gave history that he accidentally fell on soil while he was doing agricultural work about six months back. It resulted in a wound on the left side of his face, which was managed by a local physician. Past medical history revealed that the patient was diabetic and hypertensive since 20 years and was not under regular medical care. General physical examination revealed altered gait...
due to a chronic non-healing ulcer on the right foot (Fig 1a). Patient was lethargic and also had poor vision in the right eye.

Extraoral examination revealed facial asymmetry due to a swelling on the left side of face. Dark colored discharge from left nostril, swelling around periorbital area, proptosis and ptosis of eyelid with loss of vision in left eye were noted (Fig 1b). A solitary left submandibular lymphnode was palpable which was ovoid in shape, measuring about 1.5cm, firm in consistency, freely mobile and tender on palpation. Intraoral examination revealed a single ulcer on left side of hard palate measuring about 5cm in its greatest dimension, extending anteriorly from tooth #23 to posteriorly till tooth #26 and from palatal gingival margin laterally to medially till 0.5cm short of midline. It was roughly oval in shape with undermined edges and necrotic slough. The floor of ulcer was perforated on the anterior aspect and denuded yellowish grey bone was visible on the posterior region (Fig 1c). Surrounding area was inflamed and tooth #26 and tooth #27 were tender on percussion. A provisional diagnosis of palatal perforation secondary to deep fungal infection was given. In the differential diagnosis rhinocerebral mucormycosis, aspergillosis, mucopidermoid carcinoma, Wegener's granulomatosis, tertiary syphilis (gumma) and antral carcinoma were considered.

Paranasal sinus view demonstrated hyperdense left frontal and maxillary sinuses, cloudy sinuses without fluid levels, spotty destruction of bony walls of sinuses. Computed tomography examination revealed soft tissue mass of mixed attenuation value involving left cheek area. It was extending up to left orbit & left nasal cavity (Fig 2a), fungating mass involving left maxillary sinus eroding left orbital floor and involving left orbit, frontal sinus (Fig 2b) and optic nerve sheath. Also mucosal thickening, spotty bone destruction and sclerosis were seen. Right maxillary sinus was clear (Fig 2c). Fungating mass was involving left petrosal bone also. Chest radiograph was clear. Hematological and serological investigations revealed mild anemia (Hemoglobin - 9.5gm/dl), reduced RBC count (3.9 million/cubic millimeter), neutropenia (55%) and elevated fasting blood sugar (318 mg%). Ketone bodies were found in urine. Screening tests for syphilis (Venereal Disease Research Laboratory test) and human immunodeficiency virus (Enzyme Linked Immunosorbent Assay) were negative. Examination of the cytosmear from the floor of ulcer revealed nonspecific inflammation. Culture was negative.

An incisional biopsy was done in the General Surgery Department which demonstrated aspapate hyphae, confirmed the diagnosis of mucormycosis (Fig 3a and 3b). The patient was referred to a superspecialty institute, where administration of intravenous Amphotericin B, surgical debridement of the involved area and enucleation of eye was advised. However the patient refused treatment due to personal apprehensions & got discharged against medical advice. He succumbed to the disease a month later.

Discussion
The infection caused by fungi of the order mucorales is known as Mucormycosis (zygomyces).1 Rhinocerebral mucormycosis is one of the most rapidly progressive and lethal forms of fungal infections in humans and usually begins in nose and paranasal sinuses.2 Mucormycosis infection in humans is usually acquired through airborn fungal spores, contamination of traumatized tissue, ingestion and direct inoculation.3 In the present case organism might have got a portal of entry from soil through traumatized facial wound.

The predisposing factors for mucormycosis are uncontrolled diabetes (particularly in patient having diabetes ketoacidosis (DKA)), malignancies such as lymphomas and leukemias, renal failure, organ transplant, long term corticosteroid and immunosuppressive therapy, cirrhosis, burns, protein energy malnutrition and AIDS.4 In a series of 929 cases of mucormycosis by Roden et al5, diabetics most frequently presented with rhinocerebral involvement. Some studies showed 75% of mucormycosis cases associated with DKA.6,10 The causative organism in most cases is Rhizopus Oryzae.1 DKA disrupts iron binding of transferrin, resulting in increased proportion of unbound iron which may promote growth of fungus. Susceptibility of the patients with DKA to this infection may be due to decreased neutrophil chemotaxis and phagocytosis.11 In addition, microangiopathy and atherosclerosis in diabetes compromise the vascularity of tissues leading to necrosis.
Patient with diabetes mellitus has various foot disorders such as ulceration, infection, and gangrene which are the leading causes of hospitalization. The most characteristic lesion of the diabetic foot is a mal perforating ulceration which is the major risk factors for lower-extremity amputation (approximately 85%).

Rhinocerebral mucormycosis usually has three stages. First, inhaled spores infect the paranasal sinuses and necrotic lesions develop in the nasal mucosa and hard palate. Next, either direct spread of infection occurs through ethmoid sinuses or orbital infection develops via haematogenous route. Finally, infection invades the intracranial region through the cribriform plate or orbital apex. The spores invade the vascular structures and are multiplied in the elastic lamina of the arteries. Hyphae erode the endothelium of the vessel walls and then
cases necrosis, thrombus and infarcts.\textsuperscript{13} Present case was in final stage.

In the present case the thrombosis of internal maxillary artery or descending palatine artery caused by mucormycotic infection as well as chronic diabetes might have caused necrosis and denudation of underlining bone ultimately perforating the palate. The present case demonstrated almost all the clinical and radiographic features (Table 1) in addition the patient who complaint of yellow colored discharge from ear, which may be due to the involvement of petrosal bone.

<table>
<thead>
<tr>
<th>Clinical Features</th>
<th>Radiographic Features</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood-tinged nasal discharge</td>
<td>Nodular thickening of sinus lining</td>
</tr>
<tr>
<td>Facial pain</td>
<td>Cloudy sinuses without fluid levels</td>
</tr>
<tr>
<td>Perinasal swelling</td>
<td>Spotty destruction of sinus bony wall</td>
</tr>
<tr>
<td>Edema</td>
<td></td>
</tr>
<tr>
<td>Black, necrotic crusting of septum and Perforation of turbinates</td>
<td></td>
</tr>
<tr>
<td>Oral ulcers with areas of bony denudation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 1: Summary of clinical and radiological findings of mucormycosis.

On the bases of clinical features mucormycosis may assume the presentation of malignancy, syphilis, tuberculosis, Wegener’s granulomatosis, aspergillosis, and other systemic mycosis\textsuperscript{5}. This deferential diagnosis applied equally well in our case because diabetes is the most common underlying cause of fungal infections. A negative culture was obtained in the study, however it does not rule out infections.\textsuperscript{12,16} Diagnosis was made by biopsy of infected tissue.

Successful treatment of mucormycosis is based on three principles. First, any accompanying diseases should be kept under control. Second, necrotic tissues should be aggressively debrided or infected tissues should be resected. Lastly, medical treatment with antymycotic agents should be carried out.\textsuperscript{13}

**Conclusion**

An interesting case report of palatal perforation resulted by rhinocerebral mucormycosis in 70 year old uncontrolled diabetic male individual is described. This aggressive disease should be carefully differentiated from other destructive lesions which occur in the same area. Early diagnosis and management is important for better prognosis.

**Author Affiliations**

1. Dr.Guruprasad R, Professor, Department of Oral Medicine and Radiology, People’s College of Dental Science & Research Center, Bhanpur, Bhopal, 2. Dr.Som Datt Gupta, Professor & Head, Department of Oral Medicine and Radiology, Guru Nanak Dev Dental College and Research Institute, Sunam, Punjab, 3. Dr.Arpit Jain, Postgraduate student, Department of Oral Medicine and Radiology, People’s College of Dental Science & Research Center. Bhanpur, Bhopal, MP, India.

**Acknowledgement**

We would like to thank all the staff members of Department of Oral Medicine and Radiology for their support and cooperation.

**References**


Corresponding Author
Dr. GuruPrasad R,
Professor,
Department of Oral Medicine and Radiology,
People’s College of Dental Science and Research Center,
Bhanpur, Bhopal, MP, India.
Ph: +91- 8109678707,
Email: guru08@rediffmail.com

Source of Support: Nil, Conflict of Interest: None Declared.