Case Report

JRAD Journal of Research and Advancement in Dentistry

J Res Adv Dent 2017;6:1s:109-113.

# Maxillary Osteomyelities Caused by Mucormycosis

**Manish Agarwal[1*] Nimisha Desai[2] Ridhi Matariya[3] Kalpesh Makwana[4]**

[1]PG Student, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.
[2]Professor and Head, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.
[3]Reader, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.
[4]Senior Lecturer, Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.

## ABSTRACT

**Background**: Maxillary osteomyelities is rare entity due to rich vascularity. Maxillary osteomyelities caused by bacterial infection, viral infection and fungal infection such as mucormycosis, aspergillosis etc. Mucormycosis is a fungal infection commonly affecting structures in the head and neck, such as the air sinuses, orbits, and the brain. Common predisposing factors include diabetes mellitus and immunosuppression. 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 tissues.we are reporting a case of maxillary osteomyelities due to mucormycosis with the current concept in management of mucormycosis.

**Keywords:** Maxillary bone osteomyelities, mucormycosis, uncontrolled diabetes.

## INTRODUCTION

Mucormycosis is the common name given to several different diseases caused by fungi of the order Mucorales.[1,9] The patient generally has uncontrolled diabetes mellitus and is acidotic, has a hematological malignant disease like leukemia, or is receiving immunosuppressive therapy.[2,3,9] Usually mucormycosis presents as an acute infection and manifests in rhinocerebral, pulmonary, gastrointestinal, cutaneous, or disseminated forms,[4,9] rarely affecting otherwise healthy people.[5,9] The infection begins in the upper turbinate or paranasal sinuses,[6,7,9] or less commonly in the palate or pharynx. The most common presentation in the head and neck region is maxillary and orbital cellulitis in a person with inadequately controlled diabetes mellitus.[7,8,9] Since mucormycosis occurs infrequently, it may pose a diagnostic and therapeutic dilemma for those who are not familiar with its clinical presentations.

We describe our clinical experience with case of mucormycosis of the maxilla associated with uncontrolled diabetes mellitus managed at our center. The case was reported with the following aims: (1) to draw attention to the clinical presentation of mucormycosis; (2) to emphasize the need for early diagnosis and prompt and aggressive surgical management, followed by institution of specific antifungal chemotherapy to ensure a favorable outcome; (3) to create awareness that a high index of suspicion should be kept in mind in immunocompromised patients presenting with exposed bone not responding to antibiotic therapy.[9]

## CASE REPORT

A man of 51 years reported for evaluation of pain in the right maxillary posterior region since 4 weeks previously. Pain was moderate in nature, aggravated on bending the head and chewing food. The patient also complained of nasal congestion and headache. There was no history of fever, purulent discharge, paraesthesia or foul odor. The patient

**Received:** Dec. 21, 2016: **Accepted:** Feb. 12, 2017
***Correspondence Dr. Manish Agarwal.**
Department of Oral and Maxillofacial Surgery, Karnavati School of Dentistry, Uvarsad, Gandhinagar, Gujarat, India.
**Email: manishagarwalsikar@gmail.com**




pISSN 2278-0076
eISSN 2321-9270

had undergone extraction of right maxillary third molars 4 weeks earlier due to pain and mobility with poor periodontal health. Following extractions the socket healed completely. Patient had persistent pain and discomfort for the last 1 month. Patient develop small painless ulceration palatal aspect approx 3x3 cm extend from upper right canine to upper right first molar that continuously growing in size. Patient undergone routine blood analysis than he got sever hyperglycemia (RBS> 300mg/dl). The patient started diabetic treatment with oral hypoglycemics for the last 3 weeks.

Fig 1: Extra oral pic

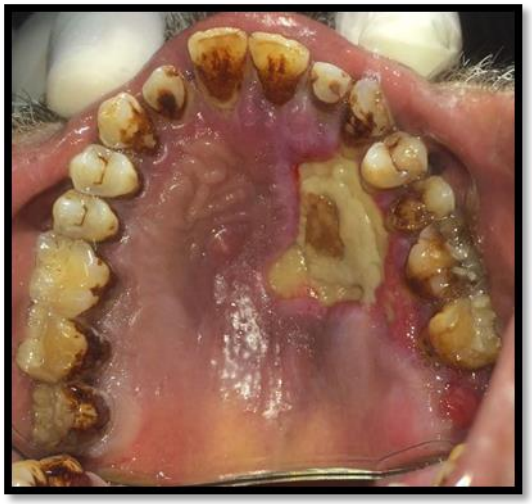


Fig 2: Intraoral lesion

In his anamnesis, the patient reported no other mucous membrane lesions or cutaneous manifestations. There was no previous history of oral or genital ulcerations. A physical examination revealed no cervical or submandibular lymphadenopathy, and no facial asymmetry. The patient was in good health, with no significant medical history. he was a tobacco cheawer since 25 years 2-3 packet per day and since 1 year he started smoking 5-6 bidi per day.

On general examination vital signs were within normal limits. Intraoral oral examination showed a necrotic bone of about 3x3 cm diameter in right maxillary molar region up to mid line (Fig-2). Maxillary third molars were missing and surrounding soft tissues were normal. Other sites of oral mucosa were normal. His teeth were peridontally compromised , and no pathology was detected in association with the bony structures.

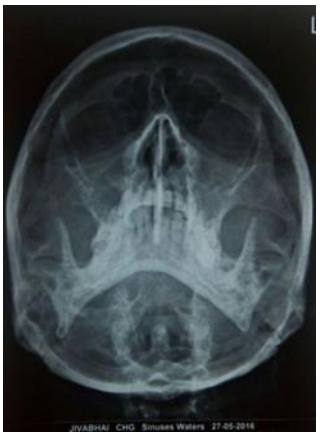


Fig 3: PNS view

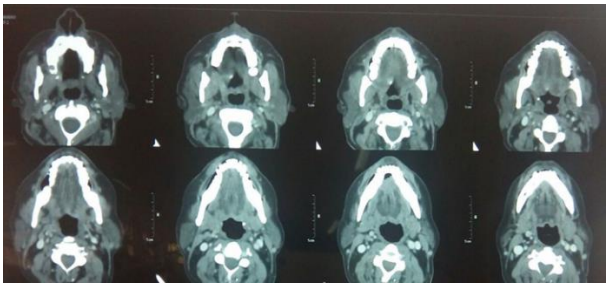


Fig 4: CT Scan

A radiograph (paranasal sinus view) was advised that showed haziness of right maxillary sinus with erosion of lateral sinus wall (Fig-3). CT scan was performed initially but no sinus related changes revealed. Biochemical investigations revealed an elevated blood sugar levels. HBA1C test performed result was 13.99 ( up to 6%normal, non diabetic level; good control 6.01-7.00%; fair control 7.01-8.00%; poor control 8.01% and above) and

estimated average giucose 354.81 . A biopsy, culture and sensitivity test were advised. Hard tissue specimen along with the adjacent soft tissue was excised under local anesthesia and sent for histopathological examination.

The patient was hospitalized and physicians controlled blood sugar levels with oral hypoglycemic drug. The patient was administered Amphotericin-B 1mg/kg/day intravenously for four weeks. It was slowly infused over 2-4 hours and blood urea and creatinine levels were monitored as the drug can cause renal toxicity. The necrotic bone along with 1 cm of adjacent bone excised under general anesthesia. Patient was administered amphotericin–B for one week. One weeks later the area started healing and subsequently after 10 days an obturator was made for the patient.

Opportunistic fungal infections such as mucormycosis usually occur in immunocompromised patients but can infect healthy individuals as well.[10,11,12,13] The predisposing factors for mucormycosis are uncontrolled diabetes (particularly in patients having ketoacidosis), malignancies such as lymphomas and leukemia's, renal failure, organ transplant, long term corticosteroid and immunosuppressive therapy, cirrhosis, burns, protein energy malnutrition and AIDS. Our patient had uncontrolled diabetes which is a well known predisposing factor for mucormycosis.[10-17] Mucormycosis (Zygomycosis, phycomycosis) is an acute opportunistic infection caused by a saprophytic fungus belongs to the class of phycomycetes. Although several genera are associated with this disease, the most common forms are Rhizopus, Rhizomucor and Absida. Rhizopus is the predominant pathogen accounting for 90% of the cases of rhinocerebral mucormycosis. This microbe may be cultured from the oral cavity, nasal passages, throat and stool of healthy patients without clinical signs of infection. Uncontrolled diabetes mellitus can alter the normal immunologic response of patients to infections. Such patients have decreased granulocyte phagocytic ability with altered polymorphonuclear leukocyte response. Reports have suggested that the ability of serum of immunocompromised patients to inhibit Rhizopus in vitro is reduced, which makes them suitable hosts to opportunistic fungal infections.[16]

This fungal infection usually originates from the paranasal sinuses. The fungus invades the blood vessels and subsequently spreads through them. Once fungal hyphae enter into the blood stream they can disseminate to other organs such as cerebrum or lungs which can be fatal for the patient. Mucor hyphae form thrombi within the blood vessels that reduce vascularity to the tissues and cause necrosis. [10-13,16] Peripheral vascular disease (due to microangiopathy & atherosclerosis) in diabetic patients also causes local tissue ischemia and increased susceptibility to infections[18](Table 1). Therefore, thrombosis of the internal maxillary artery or descending palatine artery caused by mucormycotic infection[12] as well as chronic diabetes in this patient had resulted in necrosis of the maxilla. Usually mucormycosis occurs as a pulmonary, gastrointestinal, disseminated or rhinocerebral infection.[14,15,18,19] In our patient, infection was only localized to the maxilla and it underwent necrosis without any other symptoms. Disseminated involvement of mucormycosis is observed in diabetics with ketoacidosis, which favors rapid proliferation of fungus and its invasion into the orbit and cerebrum.[14] Mucormycosis is aggressive and potentially fatal in diabetic patients because of impaired host defense mechanism and increased availability of micronutrients such as iron.[18] The general health of this patient was good and he did not developed ketoacidosis which facilitates spread of infection to other organ systems. Therefore, in this case the patient had a localized rhino-maxillary form of the disease which is a subdivision of well documented rhinocerebral mucormycosis. However, the infection may spread to involve the cranium, orbit and other organs. Therefore, a team of specialists including a dentist, ophthalmologist, neurosurgeon and maxillofacial surgeon are required for management of such patients.

In the early stages of the disease, patients exhibit facial cellulites, anesthesia, nasal discharge, necrotic turbinates, fever, headache and lethargy.[14] However, in contrast to other reports many of these symptoms were absent in this patient. He only had nasal congestion and headache. Among the clinical differential diagnosis we can consider squamous

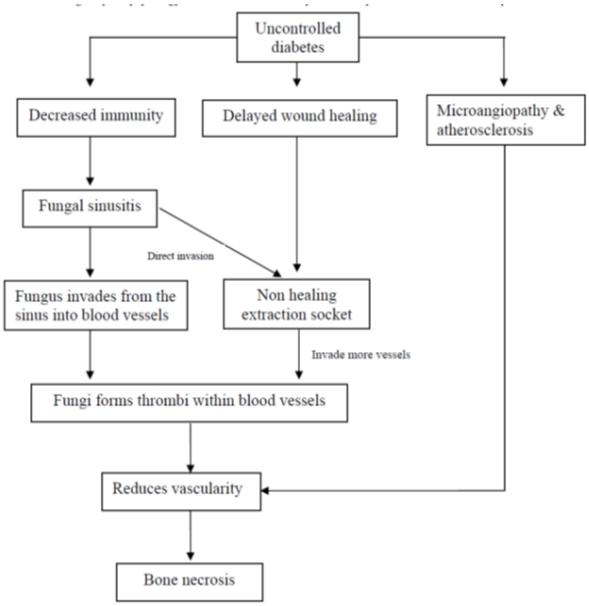
cell carcinoma of maxillary sinus. Such cases present as chronic ulcers with raised margins causing exposure of underlying bone. A malignant salivary gland tumor arising from the accessory glands of the palate can also be considered in the differential diagnosis. Other features seen in cases of antral carcinoma are local pain, swelling, epistaxis, nasal discharge, epiphora, diplopia or numbness. In this patient there were no symptoms suggestive of any malignancy.

Extranodal NK T-cell lymphoma (nasal type angiocentric lymphoma or midline lethal granuloma) characteristically occurs in midline, affecting the oronasal region. In the initial stages patients may report nasal stuffiness, pain and palatal swelling. Later, patients develop progressive areas of ulceration that can lead to bone necrosis and perforation. Wegener's granulomatosis is an uncommon condition characterized by a necrotizing granulomatous condition of respiratory tract, widespread vasculitis and necrotizing glomerulonephritis. Common presenting signs and symptoms include sinusitis, rhinorrhea, nasal stuffiness and epistaxis with or without complain of fever, arthralgia and weight loss. Gingiva has a peculiar erythematous hyperplasia and is termed strawberry gingivitis. There may be destruction of underlying palatal and alveolar bone causing oral-antral fistula. Bone necrosis can also occur due to extension of infections such as acute necrotizing ulcerative gingivitis (ANUG) from the gingiva to bone. In the case reported here the gingival was normal. Recent reports have suggested that jaw necrosis can also occur in patients on bisphosphonate therapy.[21] Our patient did not report any such drug intake.

There is a close histopathological resemblance between mucormycosis and aspergillosis. Microscopically, aspergillosis has septate branching hyphae, which can be distinguished from mucormycotic hyphae by a smaller width and prominent acute angulations of branching hyphae.[18,19] Moreover, the organism produces conidiophores, which were absent in this case. A definitive diagnosis of mucormycosis can be made by tissue biopsy that identifies the characteristic hyphae, by positive culture or both. Initial culture of diseased tissue may be negative and histopathologic examination is essential for early diagnosis[18] In this case, the fungus was identified by hematoxylin and eosin stain and confirmed by Grocott's silver methenamine special staining technique. Three principles in the patient management were followed.Firstly, control of diabetes for which the patient was advised insulin therapy and dietary restrictions. Secondly, removal of the necrotic bone, which acted as a nidus of infection and prevented action of systemically, administered antifungal drugs (due to thrombosis of blood vessels). In this patient entire necrotic bone was removed without antral lining and the area was débrided with Betadine. Lastly, amphotericin B was administered parenterally as it is the drug of choice in treatment of mucormycotic infection.[10,13] Blood urea & creatinine levels were monitored. Post-operatively patient was advised an obturator to prevent oronasal regurgitation.

Mucormycotic was long regarded as a fatal infection with poor prognosis. However, with early medical and surgical management survival rates are now thought to exceed 80%.[13] This patient survived because of an early diagnosis and prompt treatment. In conclusion, an immunocompromised or immunosuppressed patient having bone necrosis following tooth extraction should alert a clinician of possible mucormycotic infection.

Table 1: Showing pathophysiology of bone necrosis secondary to mucormucotic infection in diabetic patients.



## CONFLICT OF INTEREST

No potential conflict of interest relevant to this article was reported.

## DISCUSSION

1. Sugar AM. Agents of mucormycosis is and related species. In: Mandell,Bennett, Dolin, editors. sixth ed., Mandell Douglas and Bennett's principles and practice of infectious diseases, Vol. 2, sixth ed. Philadelphia, Pennsylvania USA: Elsevier Churchill Livingstone; 2005 . p. 2973–84.

2. Muresan A. A case of cerebral mucormycosis diagnosed in life with eventual recovery. J Clin Pathol 1960;13:34–6.

3. Rosen PP. Opportunistic fungal infections in patients with neoplastic disease. Pathol Ann 1976;11:255–315.

4. Leitner C, Hoffmann J, Zerfowski M, Reinert S. Mucormycosis: necrotizing soft tissue lesion of the face. J Oral Maxillofac Surg 2003;61:1354–8.

5. Singh J, Prasdnna NM. Phycomycosis in an apparently normal host. J Otolaryngol 1977;6:37–42.

6. Abidi E, Sismanis KC, Pastore P. Twenty-five years experience treating cerebrorhino orbital mucormycosis. Laryngoscope 1984;94:1060–2.

7. Morduchowicz G, Schmueli D. Rhinocerebral mucormycosis in renal transplant patients: report of 3 cases and review of literature. Rev Infect Dis 1986;8:444–6.

8. Marx RE, Stern D.Oral and maxillofacial pathology: a rationale for diagnosis and treatment. first ed., UK: Quintessence Publishing Co., Inc; 2006. p. 104–6.

9. Pandey et al. Maxillary osteomyelitis by mucormycosis: report of four cases. International Journal of Infectious Diseases 15 (2011) e66–e69

10. Pogrel MA, Miller CE. A case of maxillary necrosis. J Oral Maxillofac Surg 2003;61:489-93.

11. Zapico ADV, Suarez AR, Encinas PM, Angulo CM, Pozuelo EC. Mucormycosis of the sphenoidal sinus in an otherwise healthy patient. Case report and literature review. J Laryngol Otol 1996;110:471-3.

12. Jones AC, Bentsen TY, Fredman PD. Mucormycosis of the oral cavity. Oral Surg Oral Med Oral Pathol 1993;75: 455-60.

13. Salisbury PL 3rd, Caloss R Jr, Cruz JM, Powell BL, Cole R, Kohut RI. Mucormycosis of the mandible after dental extractions in a patient with acute myelogenous leukaemia. Oral Surg Oral Med Oral Pathol Oral Radiol. Endod 1997; 83:340-4.

14. Buhl MR, Joseph TP, Snelling BE, Buhl L. Temporofacial zygomycosis in a pregnant woman. Infection 1992; 20:230-2.

15. Napoli JA, Donegan JO. Aspergillosis and necrosis of maxilla: a case report. J Oral Maxillofac Surg 1991;49: 532-4.

16. Brown OE, Finn R. Mucormycosis of the mandible. J Oral Maxillofac Surg 1986;44:132-6.

17. Leitner C, Hoffmann J, Zerfowski M, Reinert S. Mucormycosis: necrotizing soft tissue lesion of the face. J Oral Maxillofac Surg 2003;61:1354-8.

18.Tugsel Z, Sezer B, Akalin T. Facial swelling and palatal ulceration ina diabetic patient. Oral Surg Oral Med Oral Pathol Oral Radiol Endod 2004;98:630-6.

19. Martin S Greenberg. Ulcerative vesicular and bullous lesions. In: Greenberg MS, Glick M eds. Burket's Oral Medicine Diagnosis and treatment. India: Elsevier; 2003.p.79.

20. Hazarika P, Ravikumar V, Nayak RG, Rao PS, Shivananda PG. Rhinocerebral mycosis. Ear Nose Throat J 1984;63:464-8.

21. Farrugia MC, Summerlin DJ, Krowiak E, Huntley T, Freeman S, Borrowdale R et al. Osteonecrosis of the mandible or maxilla associated with the use of new generation bisphosphonates. Laryngoscope 2006;116:115-20.