

Mucormycosis Masquerading as Osteomyelitis: A Diagnostic Challenge in a Young Diabetic Patient

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Abstract: ***Background:** Mucormycosis is an aggressive fungal infection mainly affecting immunocompromised patients, especially those with uncontrolled diabetes. Dental extractions can trigger infection by allowing spore entry. **Case Presentation:** We report a rare case of mucormycosis in the left maxillary premolar region following extraction of tooth 25, presenting as progressive facial swelling. Diagnosis was confirmed by clinical, radiographic, and histopathological findings. **Conclusion:** Early recognition in post-extraction sites is crucial in high-risk patients. Dental practitioners must stay vigilant to prevent delays and complications.*

Keywords: Mucormycosis, Maxilla, Extraction, Opportunistic infection

1. Introduction

Mucormycosis is an aggressive, opportunistic fungal infection caused by fungi of the order Mucorales, most commonly *Rhizopus*, *Mucor*, and *Lichtheimia* species. It primarily affects immunocompromised individuals and is known for its angioinvasive nature, resulting in vascular thrombosis, tissue necrosis, and infarction. Without early diagnosis and treatment, mucormycosis can rapidly lead to life-threatening complications and high mortality rates.^{1,2}

The most common clinical types include rhino-orbito-cerebral, pulmonary, cutaneous, gastrointestinal, and disseminated forms, with the rhino-orbito-cerebral variant being the most frequent—especially among diabetic patients and those infected with COVID-19.³ In recent years, particularly during the COVID-19 pandemic, the incidence has risen sharply due to factors such as uncontrolled diabetes, prolonged corticosteroid therapy, use of broad-spectrum antibiotics, hematological malignancies, organ transplantation, and extended ICU stays.⁴⁻⁷ The immunosuppressive state caused by SARS-CoV-2 infection and its treatment further increases the risk of secondary invasive fungal infections like mucormycosis.

Clinically, the disease often begins with non-specific signs such as facial pain, swelling, nasal congestion, or black necrotic eschar, which may delay diagnosis. Imaging (CT/MRI) along with histopathology and fungal culture are essential for confirmation.⁸ Treatment requires prompt antifungal therapy, usually liposomal amphotericin B, combined with aggressive surgical debridement of necrotic tissue. Early diagnosis and management significantly improve prognosis.

This report presents a rare case of mucormycosis localized to the left maxillary posterior region that developed after a dental extraction, highlighting the diagnostic and therapeutic challenges in dental practice and emphasizing vigilance in high-risk patients.

2. Case Report

A 23-year-old male presented with painful swelling on the left side of his face persisting for a month [Figure 1A]. He was healthy until he developed facial swelling following a dental extraction. The swelling, initially small, gradually enlarged

and was associated with throbbing pain that worsened on chewing and was temporarily relieved by medication. The patient had a history of type 1 diabetes mellitus for 10 years, managed with insulin.

Extraoral examination revealed a diffuse, non-tender swelling about 3 × 3 cm on the left midface, extending from the left ala of the nose to 2 cm anterior to the tragus, and vertically from 3 cm below the infraorbital rim to 3 cm above the mandibular border [Figure 1B]. Intraorally, gingival swellings were noted in the 24 to 26 regions, measuring around 1 × 1.5 cm with edematous surface, and a separate lesion on the alveolar ridge measuring about 0.5 × 0.5 cm with pus discharge [Figure 1C].

Based on the clinical picture, chronic suppurative osteomyelitis of the left maxilla was provisionally diagnosed. An orthopantomogram (OPG) showed absence of tooth 25, loss of lamina dura, and a breach of the sinus floor with sinus obliteration [Figure 2A]. CT axial view showed a non-homogeneous hypodense area in the left maxillary alveolus with discontinuity at tooth 25 and complete opacification of the maxillary sinus [Figure 2B]. The coronal view showed extension into the ipsilateral nasal cavity with erosion of the inferior and middle turbinates and uncinate process, along with infraorbital margin thinning [Figure 2C]. Based on imaging, a diagnosis of maxillary mucormycosis was considered.

Histopathology of soft tissue revealed numerous sprouting capillaries, dense neutrophilic infiltrate, and chronic inflammatory cells. Bone sections showed necrotic bone with empty osteocytic lacunae and broad, aseptate, ribbon-like fungal hyphae branching at obtuse angles [Figure 3]. This confirmed fungal osteomyelitis due to mucormycosis. The patient was managed with intravenous amphotericin B, strict glycemic control, and surgical debridement.

3. Discussion

Osteomyelitis is an acute or chronic inflammation of the bone's medullary spaces or cortical surfaces, extending beyond the initial site. It is classified into acute and chronic suppurative types. Acute suppurative osteomyelitis involves rapid spread of infection before the body can mount a defense, while chronic suppurative osteomyelitis develops as the immune response walls off infection with granulation tissue and sequestrum formation. In dental practice, the most

common cause is the spread of infection from a periapical abscess or following tooth extraction, particularly in immunocompromised individuals.¹²

In this case, the patient presented with progressive facial swelling and pain after extraction, fitting the profile of chronic suppurative osteomyelitis. Odontogenic space infections like buccal or canine space abscesses were considered but were less likely due to the lack of fluctuation and systemic signs. Other differentials included granulomatous infections (tuberculosis, deep fungal infections) given the patient's diabetes and chronic symptoms. However, the presence of pus discharge and the dental extraction history supported an infectious cause.

Mucormycosis, though uncommon, is a rapidly progressive and life-threatening fungal infection caused by Mucorales species such as *Rhizopus* and *Mucor*. These fungi are widespread in the environment but only cause disease in immunocompromised hosts, particularly in patients with uncontrolled diabetes mellitus. Rhinocerebral mucormycosis is the most frequent type and is strongly associated with diabetic ketoacidosis. The acidic environment favors fungal proliferation and vascular invasion, leading to thrombosis and extensive necrosis.^{9 10}

Diabetes impairs host immunity by decreasing neutrophil chemotaxis and phagocytosis, while acidosis enhances fungal growth.¹³ Radiographically, chronic osteomyelitis presents as moth-eaten bone destruction and possible sinus obliteration. Mucormycosis typically causes aggressive bone loss, sinus wall breaches, and invasion of adjacent structures. Malignancies like squamous cell carcinoma or sinonasal carcinoma can appear similar on imaging, as can granulomatous fungal infections like aspergillosis, though aspergillosis usually shows less extensive invasion.

In this case, imaging showed aggressive bone destruction involving the alveolar ridge, sinus floor, nasal cavity, and infraorbital structures, favoring mucormycosis. Histopathology confirmed this by demonstrating necrotic bone and broad, aseptate hyphae with obtuse angle branching—classic features distinguishing mucormycosis from other fungal infections like aspergillosis (thin, septate hyphae with acute angle branching) or candidiasis (budding yeast and pseudohyphae).

Combining clinical, radiographic, and histopathological evidence confirmed the diagnosis. The case illustrates the difficulty in distinguishing mucormycosis from chronic osteomyelitis or malignancy based on clinical signs alone. Prompt diagnosis is critical as delays can lead to rapid progression and high mortality. Treatment involves addressing the underlying cause (e.g., hyperglycemia), early initiation of antifungal therapy—usually liposomal amphotericin B—and aggressive surgical removal of necrotic tissue. If first-line therapy fails, posaconazole or isavuconazole may be used. Hyperbaric oxygen therapy can serve as an adjunct by enhancing immune function and tissue oxygenation.¹⁴

Despite optimal management, mucormycosis carries significant mortality, especially when diagnosis is delayed.

This case underlines the importance of early suspicion in diabetic patients presenting with facial swelling or sinus symptoms after dental procedures. It also emphasizes the need for a multidisciplinary approach for early recognition and aggressive treatment.

4. Conclusion

This case demonstrates the diagnostic challenge posed by chronic facial swelling in immunocompromised patients. Although the initial clinical impression suggested chronic suppurative osteomyelitis, advanced imaging and histopathology confirmed mucormycosis—a rare but deadly fungal infection. The overlap with other infectious and neoplastic conditions underscores the importance of a broad differential and a high index of suspicion in high-risk individuals. Early diagnosis, timely antifungal therapy, aggressive surgical management, and strict glycemic control are essential to improve outcomes. This case highlights the need for thorough diagnostic workup in post-extraction complications, particularly in medically compromised patients.

Images



Figure 1: C-maxilla



Figure 1A: Profile Photo



Figure 1 B: Lateral Profile



Figure 2 A: OPG



Figure 2 B: MRI

Figure 2 C: MRI

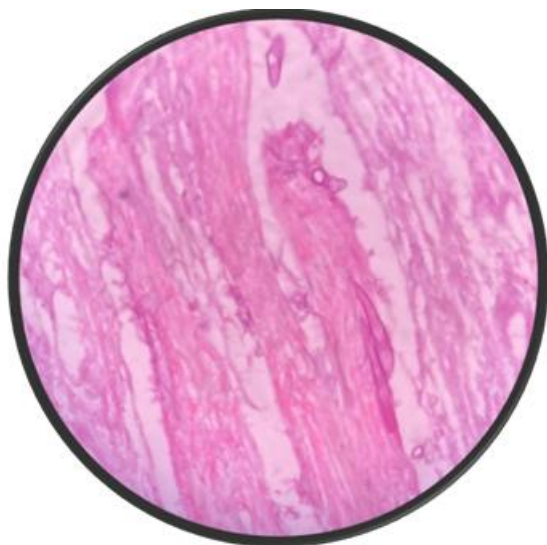


Figure 3: Histopathology

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