Case Report
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COVID-19-Associated Maxillary Osteomyelitis: A Case Report

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Objectives Mucormycosis, a lethal opportunistic infection, is associated with high rates of morbidity and mortality. The pathogenesis of this disease appears to be multifactorial, with numerous factors contributing to its onset and progression, particularly in relation to COVID-19 infection.
Case The presented case was a 41-year-old male who had a history of COVID-19 infection and had received high-dose corticosteroid therapy. He presented with a painless, extensive necrotic lesion on the right maxilla.
Conclusion A biopsy confirmed the diagnosis of maxillary mucormycotic osteomyelitis associated with COVID-19. Overall, understanding this severe infection is crucial for accurate diagnosis and prompt treatment.
Keywords Osteomyelitis; COVID-19; Maxilla; Mucormycosis.

Introduction

Osteomyelitis is an inflammatory process in the medullary cavities or on the cortical surfaces of bone. [1] Fungal osteomyelitis is a perilous opportunistic infection, often impacting the nasal and paranasal sinuses in the orofacial area. This invasive infection requires immediate treatment to avert life-threatening outcomes. The infection typically occurs through inhalation, subsequently invading vascular tissues. This can result in thrombosis and necrosis of nearby hard and soft tissues. [2] Fungal osteomyelitis of the jaw, associated with COVID-19, exhibits aggressive characteristics and necessitates prompt diagnosis and treatment. [3] This paper aimed to present a case of maxillary mucormycotic osteomyelitis linked to COVID-19 in a 41-year-old man and outlined the clinical and radiographic characteristics, histopathological results, and the approach to treatment.

Case Report

A 41-year-old man presented with a painless, extensive necrotic lesion located in the posterior region of the right maxilla, which had been present for a duration of one month (Figure 1). The cone beam computed tomography (CBCT) revealed a large lytic lesion with sequestration and an air void. There was also widening of the periodontal ligament (PDL), extending from the right molars to the left premolars (Figure 2). The patient had a history of severe COVID-19 infection, leading to a two-month hospitalization during which he had received high-dose corticosteroid therapy. Following his discharge from the hospital, he had begun using opium.

One month after hospitalization, the patient noticed the lesion. Given his medical history, a provisional differential diagnosis of osteomyelitis, mucormycosis, and a malignant lesion, such as sarcoma, was made. An incisional biopsy was performed under local anesthesia, during which teeth #13, 14, and 15 were extracted, and a piece of necrotic bone was removed. The microscopic examination revealed a non-vital bone (sequestrum) with a loss of osteocytes and peripheral resorption, bacterial colonization, and numerous large, branching, non-septate hyphae. There was also evidence of neutrophilic infiltration and foreign body materials (Figure 3). Consequently, the patient was diagnosed with mucormycotic osteomyelitis associated with a COVID-19 infection. He was treated with intravenous amphotericin B and underwent bone debridement. During the course of treatment, an oroantral fistula developed, which was subsequently closed (Figure 4).

Figure1: Large necrotic lesion of the posterior right maxilla

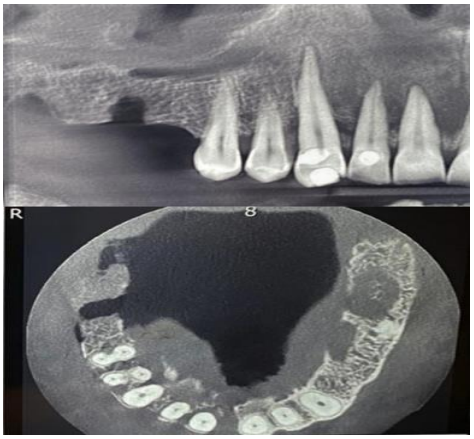

Figure2: CBCT shows an extensive lytic lesion with sequestration, air void and PDL widening.

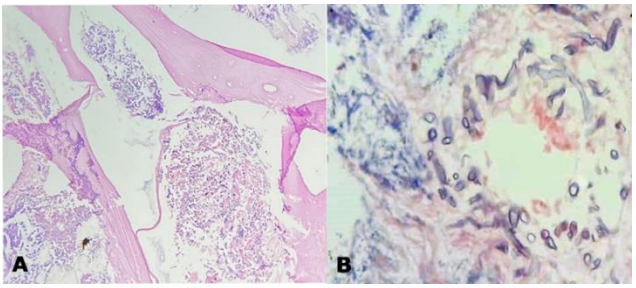

Figure3: A (H&E ×100): Histopathologic sections show sequestrum, and numerous fungal hyphae with neutrophilic infiltration. B (H&E ×400): Fungal hyphae of mucormycosis.

Figure4: Post-operative clinical feature of the patient. An oro-antral fistula after debridment occurred.

Discussion

Due to its extensive vascularity and porous structure, osteomyelitis of the maxilla is less common compared to that of the mandible. Opportunistic fungal infections include mucormycosis, candidiasis, aspergillosis, cryptococcosis, and pneumocystis. Mucormycosis, in particular, invades the arteries, leading to a reduction in blood supply and subsequent tissue necrosis. [1] This condition is more commonly observed in immunocompromised patients. Risk factors include uncontrolled diabetes mellitus, long-term steroid therapy, leukemia, lymphomas, renal failure, and AIDS. [4] Suresh et al. [3] demonstrated that during the COVID-19 pandemic, approximately 78% of fungal osteomyelitis cases were related to this infection. Furthermore, 54% of these patients had undergone steroid therapy during their COVID-19 treatment, and around 89.7% were diagnosed with diabetes mellitus. The condition showed a significant predilection for males, with an average age of 50.69 years. The patient in the current case did not have diabetes, but symptoms manifested within a month following high-dose corticosteroid therapy for COVID-19. Overall, steroid use can exacerbate existing diabetes and ketoacidosis, and when combined with a COVID-19 infection, it can hasten the onset of new diabetes cases. [5] Opium use may potentially contribute to the development of this disease. The standard treatment protocol for this condition typically involves the administration of 50 mg of liposomal amphotericin B both preoperatively and postoperatively, along with aggressive surgical debridement as early as possible . [3]

Conclusion

Maxillary mucormycotic osteomyelitis associated with COVID-19 is a serious risk for patients who have recovered from the virus, particularly due to its aggressive nature. Therefore, it is highly recommended that patients who have undergone high-dose corticosteroid treatment be made aware of this potential complication and receive regular clinical follow-ups.

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