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RECURRENT ASPERGILLOSIS OF MAXILLA – A CASE REPORT

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ABSTRACT:
Aspergillosis is an opportunistic fungal infection caused by Aspergillus species, most commonly involving the respiratory tract but on occasion affecting the maxillofacial region. Invasive forms involving the maxilla are uncommon, tend to occur in immunocompromised individuals, and often resemble conditions such as bacterial sinusitis or malignant lesions, making diagnosis challenging. We present the case of a 42-year-old male who reported with pain and ulceration localized to the left side of the hard palate. Computed tomography revealed erosion of the posterolateral wall of the left maxilla. The patient's medical history was significant for bronchial aspergillosis treated eight years earlier, followed by right hemi maxillectomy. Based on the clinical findings and imaging features, a provisional diagnosis of maxillary aspergillosis was considered, and an incisional biopsy was performed. Histopathological examination confirmed the diagnosis of aspergillosis. This case underscores the need to include fungal infections such as aspergillosis in the differential diagnosis of maxillary and palatal destructive lesions, particularly in patients with predisposing factors. Timely recognition supported by histopathological confirmation and appropriate surgical as well as antifungal therapy is crucial in minimizing morbidity and improving patient outcomes.

KEYWORDS: Maxilla, Aspergillosis, Hyphae.

INTRODUCTION

Aspergillosis is a fungal infection caused by species of the genus Aspergillus, which are ubiquitous saprophytic moulds in the environment (soil, decaying vegetation, dust)(1). Inhalation of airborne conidia (spores) is the primary mode of entry into the host, and under favourable conditions, these spores may colonize and invade tissues, especially in immunocompromised individuals(2). While Aspergillus infections classically involve the respiratory tract (especially lungs), involvement of the paranasal sinuses and maxillofacial structures is well recognized(3).

Aspergillosis of the maxilla is rare, but it may manifest in various forms ranging from non-invasive colonization (e.g. fungal ball or aspergilloma) to invasive disease with bone destruction and necrosis(3). The maxillary sinus is among the most frequently involved paranasal sinuses in fungal sinusitis and the close anatomical relationship between the maxillary sinus, alveolar process, and oral cavity may predispose the jaw bones to secondary spread(4).

Several predisposing factors increase the risk of maxillary aspergillosis, including immunosuppression (e.g., uncontrolled diabetes mellitus, leukemia or hematologic malignancy, corticosteroid therapy), prior dental procedures that breach the sinus floor (e.g., extractions, root canal treatments, sinus grafting), and chronic sinus mucosal disease or obstruction. In many reported cases, there is a preceding history of dental intervention in the ipsilateral maxilla, which may create a pathway for fungal inoculation(5),(6).

Clinically, maxillary aspergillosis can present with nonspecific symptoms such as facial or cheek pain, swelling, nasal congestion or discharge, single-sided sinus symptoms, or even palatal perforation in advanced disease. Radiographically, imaging (CT/MRI) may show opacification of the sinus, bone erosion, hyperdense foci (due to calcified fungal concretions), and sinus wall destruction. Because early lesions may mimic chronic sinusitis or other odontogenic lesions, diagnosis is often delayed or mistaken. Histopathologic examination with fungal stains (e.g., periodic acid–Schiff, Gomori methenamine silver) and culture is considered the definitive means of diagnosis(3)(2).

The management of maxillary aspergillosis typically involves surgical debridement to remove necrotic or devitalized tissues and fungal masses, combined with systemic antifungal therapy (e.g. voriconazole, amphotericin B). Prognosis depends on the extent of invasion, timeliness of intervention, and the patient's immune status.

In this report, we present a case of aspergillosis of the left maxilla in a 42-year-old male who reported with pain and ulceration localized to the left side of the hard palate. The case underscores the diagnostic challenges encountered when

fungal osteomyelitis mimics more common odontogenic pathoses, and highlights the crucial role of histopathology and imaging in guiding appropriate management.

Case Report:

A male patient of age 42 years reported to the outpatient department, complaining of pain and ulceration on the left side of the hard palate. Patient gives history of aspergillosis of the right maxilla and underwent right hemimaxillectomy 8 years ago in Andhra Pradesh. Now patient presented with synchronous ulcers in the left hard palate associated with pain and difficulty in mastication for the past 20 days.

On intraoral examination open defect was seen in the right side of the maxilla, which does not cross the midline. On the left side, there are multiple yellowish-white necrotic bone exposures visible and the surrounding mucosa is erythematous.

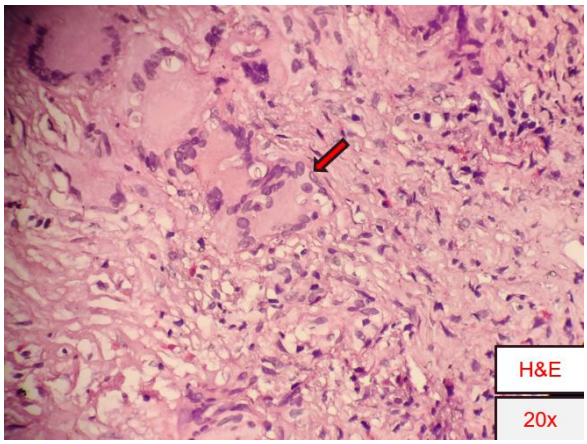

Figure 1: Left palate showing areas of necrosis and ulceration with erythematous soft tissue.

On radiographic examination, orthopantomogram (OPG) revealed a deficiency of the maxilla on the right side due to hemimaxillectomy and root stumps in 27.

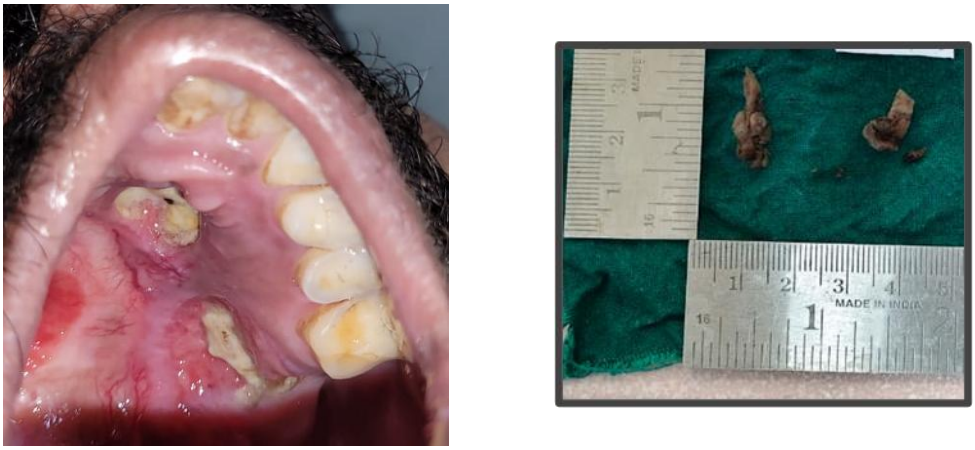

Figure 2: OPG showing deficient maxilla.

CT facial bone done. CT reveals bone erosion on left posterolateral wall of maxilla.

An incisional biopsy was done, and the specimen was submitted to the department of oral and maxillofacial pathology for final diagnosis. Received two bits (Size 1: 1x0.5 cm; Size 2: 1.2x0.6 cm) of soft tissue specimen, which were whitish in colour & soft in consistency with an irregular shape and surface. The specimen was routinely processed, sectioned and stained for histopathological examination.

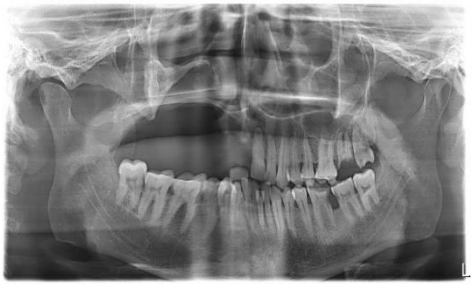

Figure 3: Showing the grossing image of the incisional specimen.

On microscopic examination, the H&E-stained sections of the given soft tissue specimen revealed non-keratinized/parakeratinized stratified squamous epithelium with features of hyperplasia. Underlying connective tissue appears fibrocellular/loose and edematous with numerous scattered multinucleated giant cells most of them resembling Langhans type. Scattered inflammatory cells predominantly macrophages, epithelioid cells, lymphocytes, eosinophils, dispersed capillaries also seen. Within the connective tissue and vascular slits structures resembling fungal hyphae (PAS +ve) with septations are seen.

Figure 4: H&E-stained sections showing Langhans giant cells (Red arrow).
Focal areas with giant cells containing fungal spores (PAS +ve) surrounded by macrophages and epithelioid cells resembling a fungal granuloma noticed. Areas of tissue necrosis, few salivary gland ducts and sections of nerves are also seen within the sections.

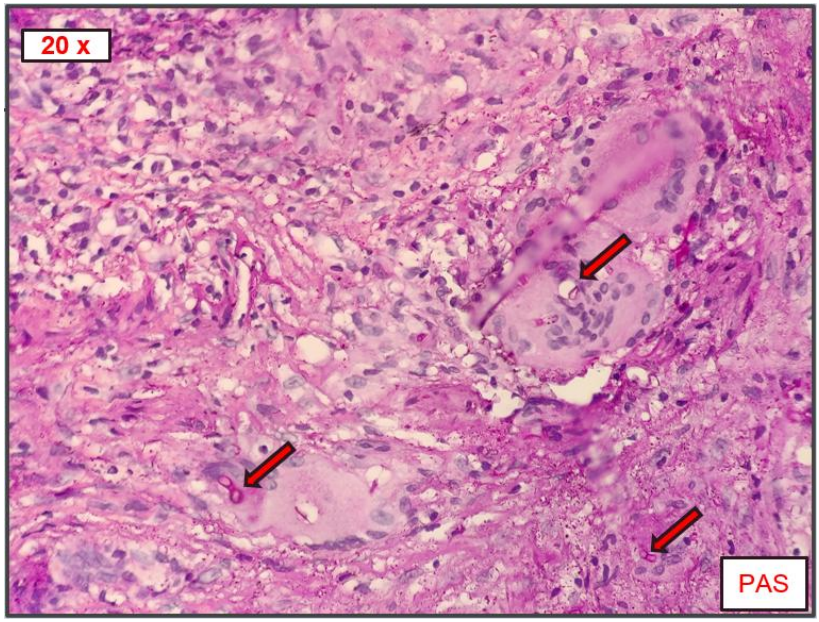

Figure 5: PAS-stained sections showing Fungal spores within the Giant cells (Red arrows).
Based upon the histopathological features, the final diagnosis was made as Aspergillosis of left maxilla. Then the maxilla was surgically excised and submitted to the Oral Pathology department for further examination.

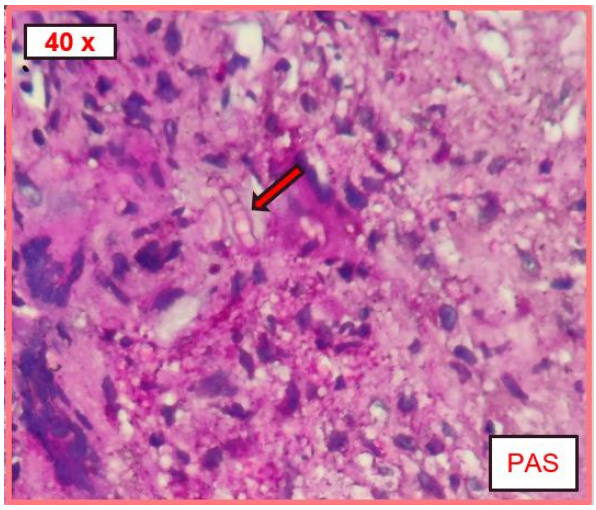

FIGURE 6: Showing the grossing image of excisional specimen
Received one large excised primary specimen of the left maxilla measuring about 5 × 6 cm, labeled as Container A and fixed in formalin. The specimen was brownish-black in color, with mixed consistency, irregular surface, and irregular shape. A separate specimen consisting of sinus lining was received in Container B, measuring 2.2 × 3.5 cm. Multiple hard and soft tissue bits were received together in Container C. The soft tissue specimens were routinely processed, sectioned, and stained, while the hard tissue specimens were routinely decalcified, processed, sectioned, and stained for histopathological examination.
On histopathological examination, The H&E stained sections of the given soft tissue specimen reveals connective tissue areas lined by ulcerated stratified squamous epithelium with slender proliferative rete processes. Within the

fibrocellular/inflamed/edematous connective tissue areas focal collections of multinucleated giant cells (Langhans/foreign body type) surrounded by macrophages reveals included spores and fragments of fungal hyphae showing septae (PAS +ve). The inflamed connective tissue areas show intense inflammatory cell infiltration (acute and chronic) with numerous capillaries resembling fungal granulomas. Most of the areas shows tissue necrosis. Dispersed yeast cells are also noticed.

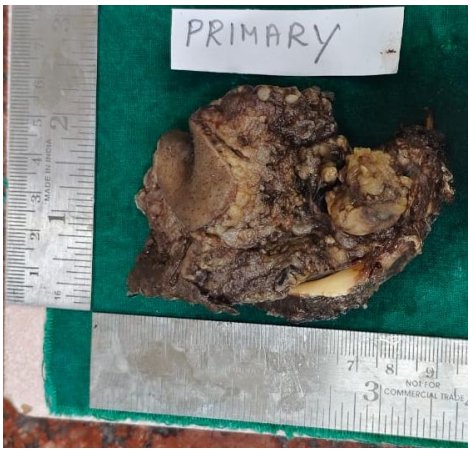

Figure 7: PAS-stained sections showing Fungal hyphae (Red arrow).

Maxillary sinus lining sections reveal homogenous eosinophilic connective tissue areas with features of chronic inflammatory cell infiltration (lymphocytes, neutrophils, macrophages) lined by ciliated columnar epithelium. In the surrounding are seen focal areas of tissue degeneration.

The H&E stained decalcified sections of the given hard tissue (bone) specimen reveals numerous fragments of bone with an intensely inflamed interstitial areas (marrow spaces). Surrounding the bony fragments are seen numerous multinucleated giant cells resembling osteoclasts resorbing the bone throughout. Also are seen dispersed langhans type giant cells within which are seen fragments of fungal hyphae and spores (PAS +ve). Surrounding the giant cells are seen collections of macrophages and lymphocytes resembling fungal granulomas. Many areas of soft tissue and bone necrosis (sequestrum) are also seen.

Gomori Methenamine Silver (GMS) staining was also done and was positive which is specifically demonstrated by grayish-black branching hyphae consistent with aspergillosis species.

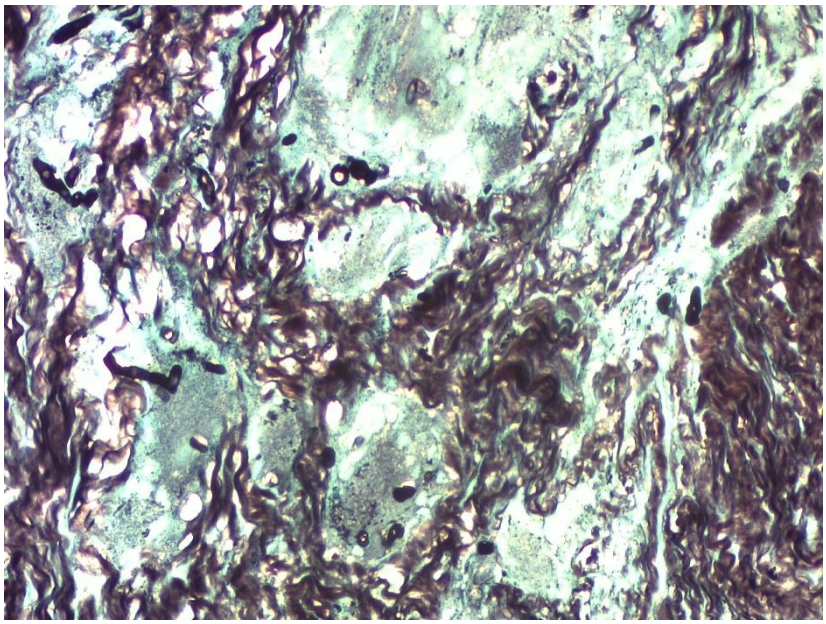

Figure 8: GMS-stained sections showing fungal hyphae (Red arrow)

DISCUSSION:

Maxillary aspergillosis represents a destructive fungal infection that often masquerades as other maxillofacial pathologies. In the present case, the patient had a history of right hemimaxillectomy for aspergillosis and presented with synchronous ulcerations on the contralateral side, highlighting the potential for recurrence or bilateral involvement in immunologically or anatomically predisposed individuals. Clinically, the lesion was characterized by painful necrotic bone exposures with erythematous surrounding mucosa, a finding consistent with invasive aspergillosis, where angioinvasion and tissue necrosis are hallmark features (7).

Histopathological examination confirmed the invasive nature of the disease. The presence of septate fungal hyphae with acute-angle branching, demonstrated on PAS staining, together with multinucleated giant cell responses and granuloma formation, is a typical diagnostic feature of invasive aspergillosis (8). In our case, fungal elements were identified not only within the connective tissue but also engulfed within Langhans-type giant cells, suggesting an ongoing granulomatous immune response. Focal areas of necrosis and fungal granulomas reflect the tissue-destructive potential of Aspergillus species, while the identification of spores and yeast-like cells emphasizes the mixed fungal morphology sometimes seen in chronic or persistent infections (9).

The sinus lining revealed ciliated respiratory epithelium with chronic inflammatory infiltrate, supporting the theory that maxillary sinuses often serve as the primary reservoir of infection, from which fungal elements extend into adjacent alveolar bone and oral mucosa (10). The decalcified bone sections provided critical evidence of osteomyelitis, with sequestrum formation, osteoclastic resorption, and fungal hyphae embedded within giant cells. These findings underscore the ability of Aspergillus to colonize marrow spaces and destroy bone, a process enhanced by its angioinvasive properties that compromise local blood supply and hinder host defense mechanisms (11).

Radiologically, bone erosion of the posterolateral wall of the maxilla was noted on CT, correlating with the histological evidence of resorption and necrosis. Such destructive changes can mimic malignancy or aggressive bacterial osteomyelitis, and therefore, fungal infections must be considered in the differential diagnosis of unilateral maxillary osteolytic lesions (12).

Management of invasive maxillary aspergillosis requires an aggressive combined approach. Surgical excision of necrotic tissue and removal of sequestrum is essential to eliminate fungal reservoirs and restore tissue viability (13). Systemic antifungal therapy, most notably with voriconazole, remains the drug of choice and has been shown to significantly improve survival compared to amphotericin B in invasive aspergillosis. Long-term follow-up is crucial, particularly in patients with a prior history of aspergillosis, as illustrated in this case (14).

This case illustrates the characteristic clinical, histopathological, and radiological features of invasive aspergillosis of the maxilla and reinforces the importance of correlating multiple diagnostic modalities. Recognition of fungal hyphae in histology, together with radiologic evidence of sinus wall destruction and clinical necrosis, provides a definitive diagnosis. Early intervention is paramount, as delay may result in progressive bone destruction, oroantral communication, or even intracranial spread. Ultimately, maintaining a high index of suspicion in patients with persistent unilateral maxillary lesions, especially those with a history of fungal infection or prior surgery, is essential for timely diagnosis and effective management.

Recent Advances:

Recent advances in the diagnosis of aspergillosis have greatly improved early detection, accuracy, and differentiation between invasive and chronic forms of the disease. Rapid point-of-care lateral flow assays (LFAs) for galactomannan (GM) and other antigens now allow near-patient testing of serum, bronchoalveolar lavage (BAL), and tracheal aspirates, providing faster results compared to traditional ELISA. Molecular techniques such as standardized quantitative PCR, droplet digital PCR (ddPCR), and multiplex panels enhance sensitivity and enable direct detection of Aspergillus DNA and azole-resistance mutations from clinical samples(15). Metagenomic next-generation sequencing (mNGS) offers a culture-independent method for identifying Aspergillus species and mixed infections, particularly in culture-negative or atypical cases. Improved interpretation of serum biomarkers like galactomannan and 1,3-β-D-glucan, especially when combined with PCR or imaging findings, has increased diagnostic reliability(16). Aspergillus-specific IgG assays have refined diagnosis of chronic pulmonary aspergillosis, while advanced imaging techniques, including high-resolution CT and emerging fungal-specific PET tracers, enhance lesion localization and disease assessment. Additionally, novel molecular platforms such as MycoGENIE® assays have enabled simultaneous detection of Aspergillus fumigatus and key azole-resistance mutations (like TR34/L98H) directly from respiratory samples, improving rapid resistance profiling and guiding antifungal therapy. Collectively, these innovations—along with integrated diagnostic algorithms combining antigen, molecular, and imaging tools—have transformed aspergillosis diagnosis from a slow, culture-dependent process into a more rapid, sensitive, and comprehensive approach enabling earlier and targeted antifungal treatment.

CONCLUSION:

Maxillary aspergillosis remains a rare but aggressive opportunistic infection that often presents with non-specific clinical features, leading to diagnostic delays. The present case emphasizes the importance of correlating clinical, radiographic, and histopathological findings for accurate diagnosis. Characteristic features such as necrotic bone exposure, fungal granulomas with septate hyphae, Langhans-type giant cells, and areas of sequestrum formation, as observed in this report, are vital for establishing the diagnosis. Early recognition is critical, as progression of the disease can result in extensive tissue destruction and life-threatening complications. Surgical debridement combined with antifungal therapy continues to be the mainstay of management, and long-term follow-up is essential to monitor recurrence or contralateral involvement. This case highlights the necessity for heightened clinical awareness, especially in patients with a history of maxillary surgery or immunocompromised status, to ensure timely intervention and improved prognosis (17)(18)(19)(20).

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