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Rhino-Orbital Mucormycosis with Secondary Cutaneous Facial Necrosis: A Rare ENT-Dermatology Correlated Case

Dr. Pooja Saroj[1], Dr. Ankush Babal[2]

[1]Department of Otorhinolaryngology, F H Medical College & Hospital, Agra, India
Email: *pooja.saroj0208[at]gmail.com*

[2]Department of Dermatology, Venereology and Leprosy, F H Medical College & Hospital, Agra, India
Email: *ankushbabal01234[at]gmail.com,*

Abstract: ***Rhino-orbital mucormycosis is an aggressive, angioinvasive fungal infection predominantly affecting immunocompromised individuals, especially those with uncontrolled diabetes mellitus and recent corticosteroid use. Secondary cutaneous facial involvement is rare and indicates advanced disease with increased morbidity and mortality. We report a rare case of rhino-orbital mucormycosis in a 54-year-old diabetic male with a recent history of COVID-19–associated steroid therapy. The patient presented to the ENT outpatient department with unilateral facial pain, nasal obstruction, and blood-tinged nasal discharge. Endoscopic examination revealed necrotic nasal mucosa, and microbiological evaluation confirmed mucormycosis. Despite early diagnosis and initiation of antifungal therapy, the patient developed rapidly progressive secondary cutaneous facial necrosis over the left malar region. Histopathology of skin biopsy demonstrated angioinvasive, aseptate fungal hyphae, confirming secondary cutaneous mucormycosis. Management involved aggressive multidisciplinary care with intravenous liposomal amphotericin B, strict glycaemic control, repeated endoscopic sinus debridement, and surgical excision of necrotic facial skin. Secondary cutaneous facial necrosis in rhino-orbital mucormycosis represents severe disease progression. Early recognition, prompt antifungal therapy, radical surgical debridement, and close ENT–Dermatology collaboration are crucial to improving survival and clinical outcomes.***

Keywords: Mucormycosis; Rhino-orbital mucormycosis; Cutaneous facial necrosis; Black eschar; Invasive fungal sinusitis; ENT–Dermatology interface

1. Introduction

Mucormycosis is a rapidly progressive, opportunistic, angioinvasive fungal infection caused by fungi belonging to the order Mucorales. It predominantly affects immunocompromised individuals, particularly those with uncontrolled diabetes mellitus, haematological malignancies, or patients receiving systemic corticosteroids. Among its various clinical forms, rhino-orbitocerebral mucormycosis is the most common and most frequently encountered by otorhinolaryngologists.

The disease is characterized by invasion of blood vessels, resulting in thrombosis, tissue ischemia, and necrosis. Cutaneous involvement in mucormycosis is relatively rare and may occur either as a primary infection due to direct inoculation or as secondary extension from deeper structures such as the nasal cavity and paranasal sinuses. Secondary cutaneous facial necrosis signifies advanced disease and is associated with increased morbidity and mortality.

Early diagnosis and prompt multidisciplinary management involving ENT surgeons, dermatologists, physicians, and microbiologists are crucial for improving patient outcomes. We report a rare and severe case of rhino-orbital mucormycosis presenting initially to the ENT outpatient department, which subsequently developed secondary cutaneous facial necrosis requiring aggressive combined management.

2. Case Study

A 54-year-old male presented to the ENT outpatient department with complaints of left-sided facial pain, nasal obstruction, and blood-tinged nasal discharge for the past six days. The facial pain was severe, deep-seated, and progressively worsening, associated with headache and a sensation of facial heaviness. He also complained of mild swelling over the left cheek.

The patient was a known case of type 2 diabetes mellitus for the past 15 years with poor glycemic control. He had been hospitalized one month earlier for COVID-19 pneumonia, during which he received systemic corticosteroids and oxygen therapy. There was no history of trauma, dental extraction, or prior nasal surgery.

3. ENT Examination

On general examination, the patient appeared ill but was hemodynamically stable. Local examination revealed tenderness over the left maxillary region with mild facial edema. Anterior rhinoscopy showed blackish crusting over the left inferior turbinate and lateral nasal wall. The nasal mucosa appeared pale and insensitive to touch. Oral cavity examination revealed mild erythema of the hard palate without ulceration or perforation. Ophthalmological examination showed no visual impairment, ophthalmoplegia, or proptosis at presentation. Diagnostic nasal endoscopy revealed extensive necrotic tissue over the left inferior turbinate, middle meatus, and lateral nasal wall. The mucosa

appeared devitalized and bled minimally on contact, raising strong suspicion of invasive fungal sinusitis, most likely mucormycosis.

4. Investigations

Laboratory investigations revealed markedly elevated random blood glucose levels and metabolic acidosis. Complete blood count showed mild leukocytosis. A KOH mount from nasal tissue demonstrated broad, aseptate fungal hyphae with right-angle branching. Contrast-enhanced MRI of the paranasal sinuses revealed involvement of the left maxillary and ethmoid sinuses with extension into the nasal cavity and infraorbital region, consistent with rhino-orbital mucormycosis. Based on clinical, radiological, and microbiological findings, a diagnosis of rhino-orbital mucormycosis was made.

5. Dermatological Involvement

On the third day of hospitalization, the patient developed a rapidly progressive black discoloration over the left cheek associated with skin tightening, pain, and numbness. Dermatology consultation was sought.

Cutaneous examination revealed an ill-defined indurated plaque over the left malar region measuring approximately 6 × 5 cm, with a central black necrotic eschar surrounded by erythema and edema. The lesion was tender with reduced sensation over the necrotic area. These findings were suggestive of secondary cutaneous mucormycosis due to angioinvasive spread. A deep skin biopsy taken from the edge of the lesion revealed broad, ribbon-like aseptate hyphae invading dermal blood vessels, confirming cutaneous mucormycosis.

6. Treatment Plan

6.1 Medical Management

The patient was immediately shifted to intensive care and managed jointly by ENT, Dermatology, Medicine, and Microbiology teams.

- Intravenous liposomal amphotericin B was initiated at a dose of 5 mg/kg/ day.
- Strict glycaemic control was achieved using insulin infusion.
- Broad-spectrum antibiotics were administered to prevent secondary bacterial infection.
- Renal function and electrolytes were closely monitored throughout antifungal therapy.

6.2 Surgical Management

The ENT team performed urgent endoscopic sinus surgery with extensive debridement of all necrotic tissue from the nasal cavity, maxillary, and ethmoid sinuses. Devitalized tissue was removed until healthy bleeding margins were achieved.

The Dermatology and Plastic Surgery teams performed surgical debridement of necrotic facial skin, preserving viable tissue wherever possible. Repeat debridement was required after 72 hours due to persistent necrosis.

7. Follow-Up

The patient showed gradual clinical improvement over the next two weeks. Facial pain and swelling reduced significantly, and no further progression of necrosis was observed. Serial nasal endoscopy demonstrated healthy granulation tissue. After receiving an adequate cumulative dose of amphotericin B, the patient was transitioned to oral posaconazole for consolidation therapy. The facial wound healed by secondary intention, leaving residual scarring. At three-month follow-up, the patient remained clinically stable with no evidence of recurrent disease. ENT and dermatological examinations were normal.

8. Discussion

Rhino-orbital mucormycosis is a life-threatening condition requiring early diagnosis and aggressive management. Cutaneous facial necrosis represents advanced angioinvasion and indicates poor prognosis if not promptly treated. ENT surgeons are often the first to encounter such patients due to sinonasal symptoms, while dermatological manifestations may appear later as secondary spread.

Early recognition of warning signs such as black eschar, facial numbness, and rapidly progressive necrosis is critical. Successful management depends on early antifungal therapy, radical surgical debridement, correction of underlying metabolic abnormalities, and close multidisciplinary coordination.

9. Conclusion

Rhino-orbital mucormycosis presenting to ENT OPD with subsequent secondary cutaneous facial necrosis is rare but highly aggressive. ENT surgeons must remain vigilant for cutaneous signs of disease progression. Early dermatology involvement, aggressive antifungal therapy, and repeated surgical debridement are essential to reduce mortality and improve outcomes.

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