Rhino-orbito-cerebral mucormycosis with fulminant ophthalmologic involvement in an immunocompromised patient: a fatal case report.

Abstract

Introduction: Rhino-orbito-cerebral mucormycosis (ROCM) is a rare but aggressive invasive fungal infection affecting immunocompromised patients, with high mortality rates [1,2].

Case presentation: A 65-year-old male on long-term corticosteroid therapy for chronic kidney disease presented with acute orbital pain, facial swelling, and rapid visual loss. Clinical examination revealed total ophthalmoplegia, axial exophthalmos, and fixed mydriasis. Imaging demonstrated orbital cellulitis with optic nerve involvement and extensive sinus disease with intracranial extension. The patient received intravenous amphotericin B and underwent extensive endoscopic surgical debridement. Despite aggressive management, he developed multiple cerebral thrombotic events and died.

Conclusion: ROCM remains a medical and surgical emergency with poor prognosis. Early recognition of orbital signs is critical for improving outcomes.

Introduction

Mucormycosis is a rare opportunistic fungal infection caused by filamentous fungi of the order Mucorales, predominantly affecting immunocompromised individuals, particularly those receiving prolonged corticosteroid therapy or presenting with metabolic disorders [1,2]. The rhino-orbito-cerebral form represents the most frequent and severe presentation [2]. The infection typically originates in the paranasal sinuses and spreads rapidly to the orbit and central nervous system through angioinvasion, leading to vascular thrombosis and extensive tissue necrosis [3,4]. Ophthalmologic manifestations often represent a critical stage in disease progression and may constitute an early diagnostic clue.

Case Presentation

A 65-year-old male with a history of chronic kidney disease treated with long-term corticosteroid therapy presented with an acute onset of right orbital pain associated

with facial and palpebral swelling and rapidly progressive visual impairment. On ophthalmologic examination, visual acuity was severely impaired with doubtful light perception. There was marked inflammatory eyelid edema, total ophthalmoplegia, and a non-pulsatile, non-reducible axial exophthalmos. Additional findings included conjunctival chemosis, inferior corneal ulceration with reduced corneal sensitivity, and a fixed dilated pupil.

Otorhinolaryngological examination revealed necrosis of the middle turbinate and nasal septum, findings classically described in invasive fungal sinusitis [5–7]. Neurological evaluation demonstrated multiple cranial nerve involvement, including a peripheral facial nerve palsy classified as House-Brackmann grade IV and trigeminal nerve impairment with hemifacial anesthesia. These findings were highly suggestive of an aggressive locoregional infectious process with orbital and neurological extension.

Radiological investigations were promptly performed to assess disease extension. Computed tomography of the orbit and brain demonstrated right-sidedpreseptal orbital cellulitis. Magnetic resonance imaging provided further details, revealing abnormal signal intensity along the right optic nerve consistent with ischemic optic neuropathy. There was also evidence of infiltration of both intra- and extraconal orbital fat, associated with significant exophthalmos. Additionally, sphenoidal and maxillary sinusitis was observed, with extension into deep facial spaces and associated meningeal enhancement, indicating intracranial involvement. These radiological findings are typical of advanced rhino-orbito-cerebral mucormycosis [1,3].

Laboratory findings showed a marked inflammatory response with leukocytosis reaching 36,000/mm³ and a C-reactive protein level of 360 mg/L. The patient also presented with severe renal impairment and hyperkalemia. Microbiological evaluation through nasal swab suggested a fungal infection; however, it is well established that the definitive diagnosis of mucormycosis relies on histopathological examination, as cultures may lack sensitivity and specificity [1,3].

The patient was immediately started on intravenous amphotericin B as first-line antifungal therapy, which remains the cornerstone of treatment for mucormycosis [1]. This was combined with broad-spectrum antibiotics including a third-generation cephalosporin, aminoglycosides, and metronidazole. Due to clinical deterioration and worsening renal function, antimicrobial therapy was later escalated in an intensive care setting.

Surgical management consisted of urgent endoscopic sinus surgery with extensive debridement of necrotic tissues, as recommended in current guidelines [1,2]. The procedure included necrosectomy, middle and inferior turbinectomy, middle meatal antrostomy, ethmoidectomy, sphenoidotomy, and maxillectomy. Given the severity of

orbital involvement, orbital exenteration was considered, as described in advanced cases with orbital extension [2,3].

Despite aggressive medical and surgical management, the patient's clinical condition progressively deteriorated. He developed worsening renal failure requiring intensive care management. Subsequently, multiple cerebral thrombotic events occurred, consistent with the angioinvasive nature of mucormycosis leading to vascular thrombosis and infarction [3,4]. These complications ultimately led to a fatal outcome, highlighting the fulminant course and poor prognosis associated with advanced rhino-orbito-cerebral mucormycosis.

Discussion

Mucormycosis is characterized by its angioinvasive properties, leading to vascular thrombosis, ischemia, and tissue necrosis, which facilitate rapid disease progression [3,4]. Ophthalmologic manifestations such as ophthalmoplegia, proptosis, and rapid vision loss are often early indicators of orbital involvement and should prompt urgent investigation [2].

Diagnosis remains challenging and relies on a combination of clinical suspicion, imaging findings, and histopathological confirmation [1,3]. While imaging is essential to determine the extent of disease, it lacks specificity. Management requires a multidisciplinary approach combining early antifungal therapy, aggressive surgical debridement, and correction of underlying risk factors [1,2].

The prognosis of rhino-orbito-cerebral mucormycosis remains poor, particularly in cases with intracranial extension, where mortality rates exceed 80% despite optimal treatment [2,3].

Conclusion

Rhino-orbito-cerebral mucormycosis is a life-threatening infection requiring prompt recognition and aggressive management. Ophthalmologic signs play a crucial role in early diagnosis and should alert clinicians to possible orbital and cerebral extension. Early multidisciplinary intervention remains the cornerstone of improving patient outcomes.

References

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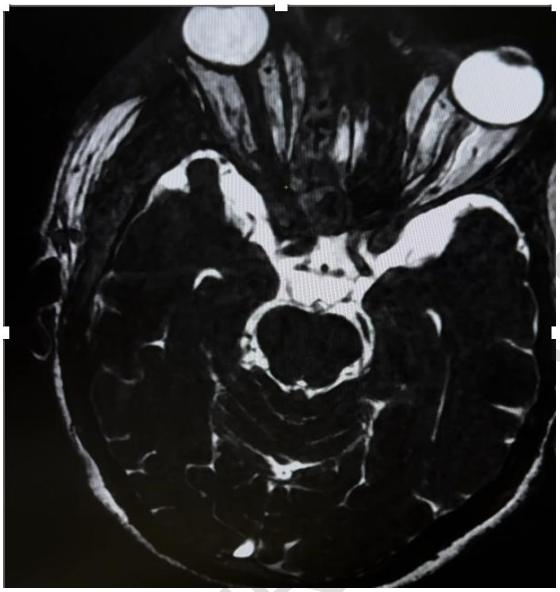

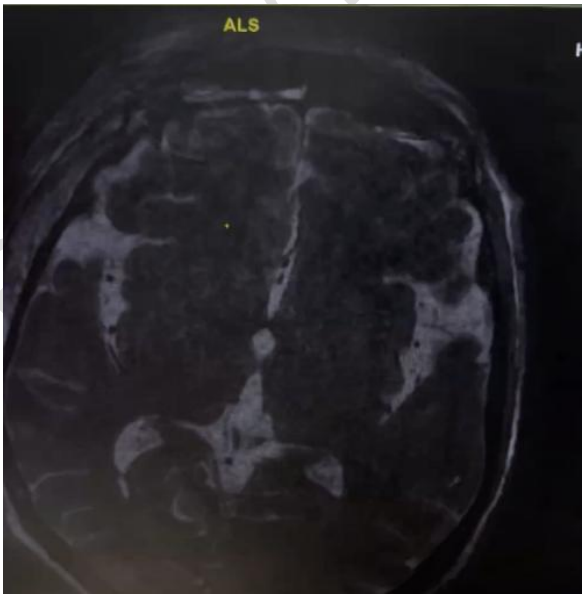

The MRI shows an optic nerve involvement.
As well as a right maxillary sinusitis with extension towards the infratemporal space, the parotid and masseteric regions, and a

CLINICAL ASPECT OF A STRAIGHT SINUSITIS ORBITO MUCORMYCOSIS