Rhino-orbital mucormycosis in a COVID-19 patient

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DESCRIPTION

A 28-year-old male patient presented with a 5-day history of sudden vision loss and swelling of the right eye along with a history of cough and fever. He denied any previous ocular trauma or nasal symptoms. His previous medical charts ruled out any cause for immunosuppression except a history of acute viral hepatitis-A 5 years back. General examination was unremarkable. Ocular examination revealed proptosis of the right eye with conjunctival congestion, chemosis, erythematous and swollen upper and lower eyelids (figure 1A). He denied perception of light on the right eye with a fixed dilated pupil and complete ophthalmoplegia. Examination of other eye and nose was unremarkable. An oropharyngeal swab for reverse-transcriptase PCR (RT-PCR) was positive for SARS-CoV-2 virus with a cycle threshold value of 30. The routine blood investigations were unremarkable. The fasting and 2-hour postprandial blood sugar values were within normal limits with a haemoglobin A1c value of 5.5%. A contrast-enhanced CT scan of nose and paranasal sinus with orbit showed right intraconal and retrobulbar soft tissue density along with mucosal thickening in the right ethmoid sinus (figure 1B). His chest radiograph showed diffuse bilateral ground-glass opacities consistent with COVID-19 pneumonia (figure 1C). An orbital biopsy revealed broad aseptate fungal hyphae suggestive of mucormycosis. Immune deficiency syndromes including HIV (ELISA test) and hypocomplementemia were ruled out owing to the presence of an opportunistic fungal infection in a healthy adult. Intravenous broad-spectrum antibiotics (meropenem 500 mg thrice a day and teicoplanin 200 mg twice a day) were administered for probable bacterial superinfection of COVID-19 pneumonia along with liposomal amphotericin-B for rhino-orbital mucormycosis. The presence of active fulminant mucormycosis precluded the use of corticosteroid therapy. The patient underwent right-side orbital exenteration and ethmoid sinus debridement under general anaesthesia with universal precautions using optimum personal protective equipment. He had completed the course of parenteral antifungal therapy and clinically disease free at 2-month follow-up period post COVID-19 recovery.

Rhino-orbital mucormycosis is an acute and fulminant fungal infection caused by the angioinvasive fungi of the family Mucoraceae and seen usually among immunocompromised subjects and patients with decompensated diabetes.[1] Though the primary site of fungal inoculation is the nose and paranasal sinuses, these aggressive fungi proliferate and spread to orbit and brain by direct extension or through haematogenous route causing rhino-orbital or the life-threatening rhino-cerebral mucormycosis. SARS-CoV-2 infection itself induces an immunosuppressive state by affecting the T-lymphocytes causing lymphopenia, particularly CD4+ and CD8+ T cells which play a vital role in cell-mediated immune responses, and cause alteration of neutrophil to lymphocyte ratio.[2 3] The higher levels of inflammatory cytokines observed among cases of severe COVID-19, presence of comorbid illness like diabetes mellitus and the use of concurrent glucocorticoid therapy and other immunomodulatory drugs for the management of moderate to severe cases potentiates the net state of immunosuppression predisposing the patient to opportunistic fungal infection during the course of illness.[4 5] The published literature on the rare association of invasive rhino-orbital mucormycosis among COVID-19 patients is limited to few case reports citing uncontrolled diabetes as the predisposing risk factor unlike this patient who lacks any pre-existing immunosuppressive state.[5–7] A tissue biopsy from orbit or nose showing the presence of

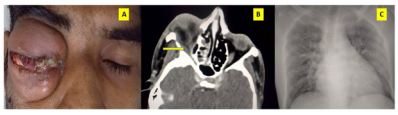

Figure 1 (A) Clinical image of the patient showing right eye proptosis and periorbital oedema. (B) Contrast-enhanced CT (axial view) of nose and paranasal sinuses with orbit showing intraconal and retrobulbar (yellow arrow) soft tissue density causing proptosis with mucosal thickening of ethmoid sinuses. (C) Chest radiograph image (anteroposterior view) showing diffuse ground-glass opacities in bilateral lung fields.

Learning points

- The rising incidence mucormycosis, the fulminant opportunistic fungal infection commonly seen among immunocompromised individuals, among COVID-19 patients is a point of concern.
- COVID-19-induced immunomodulation and widespread use of steroid therapy in the management of severe COVID-19 are the probable predisposing factors.
- Despite early and aggressive therapy and surgical management, rhino-orbital mucormycosis carries a poor prognosis.

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branched aseptate hyphae with tissue invasion confirms the diagnosis of mucormycosis, while contrast-enhanced CT and MRI of the nose and paranasal sinuses with orbit and brain can detect the extent of infection and complications. Systemic antifungal therapy, early complete surgical debridement and management of underlying predisposing conditions are the mainstay of treatment.[8] A clinical and radiological follow-up is mandatory to rule out any recurrence and despite early and aggressive treatment, rhino-orbital mucormycosis carries a poor prognosis.

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