Post-COVID-19 sino-orbital mucormycosis: a case report

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ABSTRACT

Mucormycosis is an invasive fungal infection caused by fungi of the order Mucorales. Mucorales fungi are ubiquitous in environment in association with decaying organic matter. Here we report the case of a 68-year old female who presented with history of ptosis of the left eye with decreased vision, facial pain and loss of sensation in the left cheek. She had history of COVID-19 infection. Magnetic resonances imaging of the brain revealed intense enhancement of left optic nerve. Bilateral spenoidal, ethmoidal and left maxillary sinus showed mucosal thickening. Histopathological and microbiological examination of the specimen confirmed the case of invasive mucormycosis. Despite treatment, patient died at 7th day of hospitalization.

Keywords: COVID-19, sino-orbital mucormycosis

INTRODUCTION

Mucormycosis is an invasive fungal infection caused by fungi of the order Mucorales belongs to Zygomycetes class like Mucor, Rhizopus, Rhizomucor, Cunninghamella and Absidia.1 They are ubiquitous ,and morphologically appear as broad,aseptate or sparsely septate ribbon-like hyphae.2 The most common risk factor associated with mucormycosis is diabetes mellitus in India in contrast to hematological malignancy and transplant recipients in Europe and the United States.2

Rhizopus oryzae is the most common cause of mucormycosis in humans being responsible for 90% of the rhino-orbital-cerebral (ROCM) form of manifestation.3 Based on the anatomical site of involvement, ROCM mucormycosis is the commonest form (45–74%), followed by cutaneous (10–31%), pulmonary (3–22%), renal (0.5–9%), gastrointestinal (2–8%), and disseminated infections (0.5–9%).4

Mucormycosis is frequently seen in patients with immunosuppression, diabetes mellitus, injection drug use, trauma, burns, malnutrition, iron overload, treatment with deferoxamine, hematological malignancy and corticosteroid therapy.5

Infection presumed to occur after inhalation of spores. In healthy people, spores are transported by cilia to pharynx and are cleared through gastrointestinal tract. In immunocompromised individuals, spores are not cleared and infection usually begins in nasal sinuses or pulmonary alveoli. Organisms are angioinvasive, causing tissue infarction and necrosis.

CASE REPORT

A 68-year-old female, who had recently recovered from COIVD-19 infection, presented to our hospital with complaints of sudden-onset ptosis of the left eye for seven days associated with decreased vision, facial pain and loss of sensation in the left cheek. Over a course of four days in the hospital, she had total loss of vision in the left eye and the left pupil was dilated and fixed (Figure 1). Vision in the right eye was normal. Her blood sugar was not controlled with her regular dose of insulin. During her hospitalization with COVID-19 infection, she was treated with injectable and oral steroids for 2 weeks supplemented with azithromycin and oxygen. On clinical suspicion, a contrast MRI was done along with endoscopic biopsy from left nasal cavity.

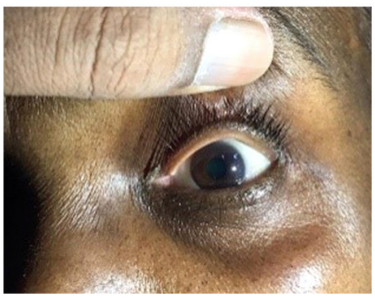

Fig.1. Preoperative photograph showed dilatation of left pupil and fixed

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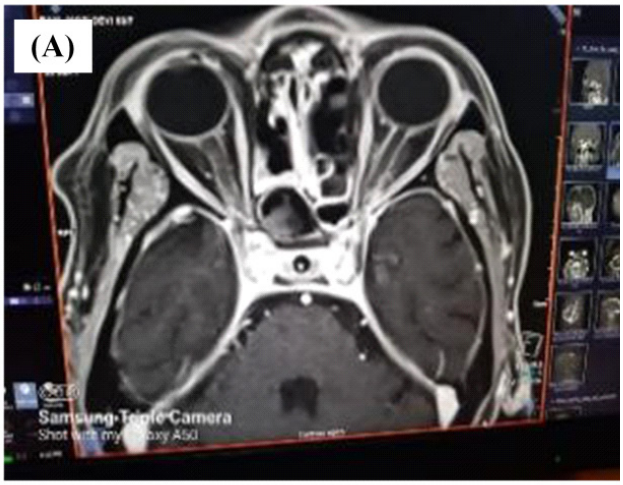
Endoscopic examination showed blackish inferior and middle turbinate on left side and necrosed nasal septal mucosa. Extensive black crusts with possible whitish fungal hyphae with black dotted spores were noted.

Contrast MRI only showed intense enhancement of left optic nerve (Figure 2). Mild soft tissue stranding noted in intraconal fat. Bilateral sphenoidal, ethmoidal and left maxillary sinus showed mucosal thickening



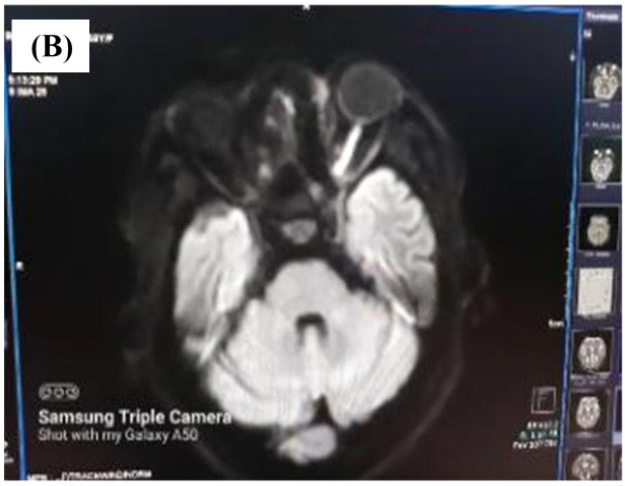


Fig.2.(A)Contrast MRI showed heterogenously non enhancing inferior turbinate left and Diffusion weighted MRI (B) showed low signal noted suggesting restriction of diffusion.

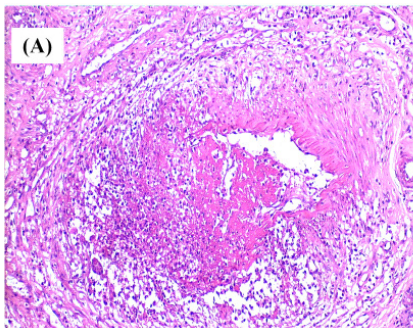
On admission her laboratory parameters were as follows:

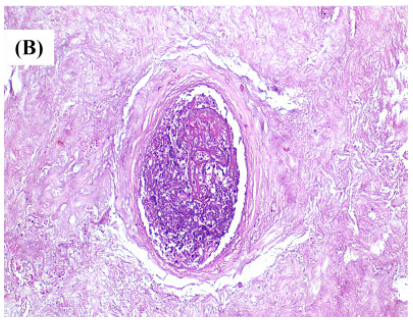
HbA1C 13%, serum urea 71mg/dl, serum creatinine 0.8mg/dl, liver function test and electrolyte: within normal limit, total leucocyte count: 13640 cells/cumm, CRP: 86mg/L (reference range <10mg/L), ferritin: 310ng/ml (reference range 11.1-264ng/ml).

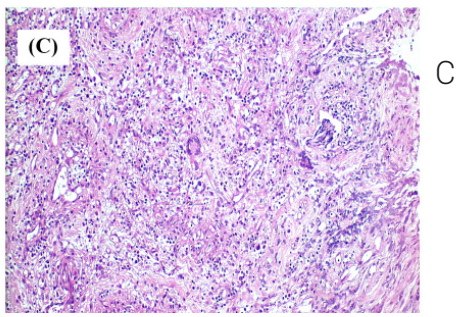
With a presumptive diagnosis of secondary infection with mucormycosis, she was treated with meropenem and amphotericin B along with sliding scale of regular insulin.

Microbiological studies were performed on tissue biopsy. On KOH preparation, thick-walled aseptate branching hyphae with sporangiospore were seen. Samples were also inoculated on two sets of Sabouraud dextrose agar, incubated at 250C and 370C, respectively. After two days colonies were noted on the media and Rhizopus oryzae was identified morphologically by lactophenol cotton blue dye.Growth was not noted on blood culture. However, urine culture and sensitivity showed significant growth of multi drug resistant Klebsiella pneumoniae.

The histopathological examination of nasal and orbital tissue showed thin walled , ribbon-like hyphae with few septation and right angle branching. Hyphae are angio invasive causing tissue necrosis, hemorrhage and blood vessel thrombosis.(Figure 3).







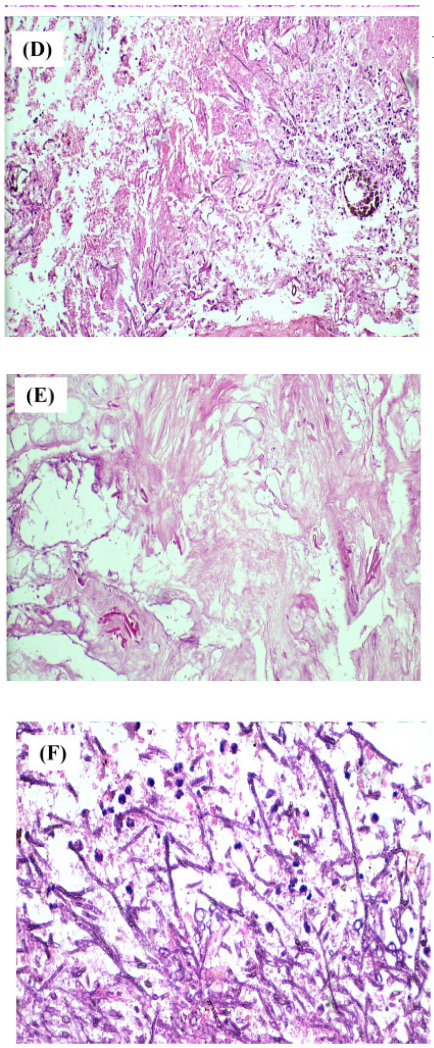


Fig.3 (A-F): A: Fibrinoid necrosis of vascular wall surrounded by mixed inflammatory cell infiltrates. B: Fungal hyphae along with inflammatory cell infiltrate within vascular lumina. C:Granulation tissue with multinucleated giant cell. D-F: Broad aseptate hyphae with right angle branching. (H & E stain, x100)

DISCUSSION

Mucorales are saprophytic fungi and are common inhabitants of decaying matter; they are found in soil, air, dust and hospital ward rooms.6, 7, 8

The most common risk factors for mucormycosis are immunosuppression, e.g., AIDS, hematologic malignancies, solid organ transplant recipients, hematopoietic stem cell transplant recipients, glucocorticoid recipients, diabetes mellitus with poor glycemic control, treatment with deferoxamine, iron overload and malnutrition.9

The most common route of entry into the host is through the respiratory tract and it exhibits a remarkable affinity for arteries and grows along internal elastic lamina causing thrombosis and infarction.10, 11 The progression of the disease from nose and sinuses is either by direct invasion or vascular invasion and occlusion.12

Diagnosis of mucormycosis is based on clinical features, micobiological findings and pathological investigations. MRI plays an important role in diagnosis and in defining the extent of involvement.13 Early diagnosis and prompt surgical intervention are required to control the severity and extent of the disease. Amphotericin B and surgical debridement are the two mainstay of treatment of mucormycosis.

CONCLUSION

Mucormycosis is common opportunistic infection following COVID-19 infection predominantly in patients with diabetes mellitus or in immunocompromised individuals:

CONFLICT OF INTEREST

None

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