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Letter to Editor

Radiology Section

Role of Diffusion-Weighted MRI in Imaging of Mucormycosis in Paranasal Sinuses

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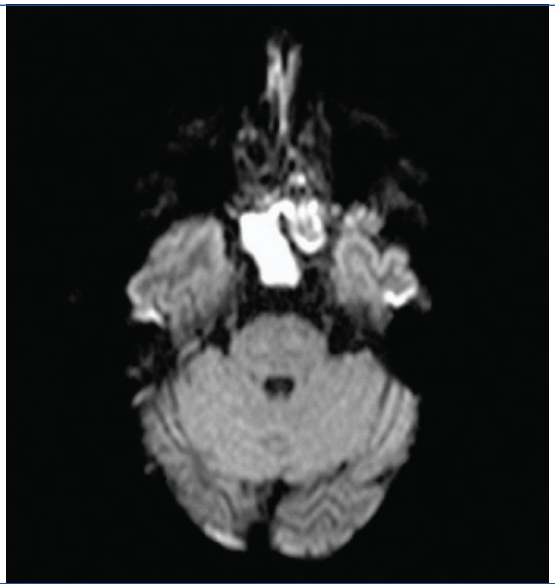
Dear Editor,

Mucormycosis is a fatal angioinvasive fungal sinusitis. Predisposing factors include diabetes mellitus, immunodeficiency, corticosteroids, and immunosuppressive drugs, iron overload, haematological stem cell transplantation, and malignancies [1]. It is caused by fungi of order mucorales which include mucor, rhizopus, and absidia species.

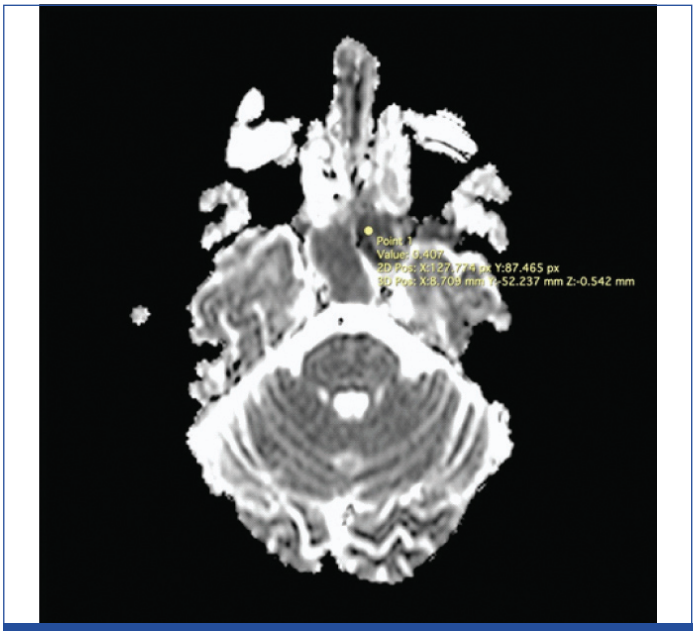
A 61-year-old diabetic male patient was referred to Department of Radiodiagnosis, for a contrast-enhanced Magnetic Resonance Imaging (MRI) paranasal sinus study. The patient had a history of Coronavirus Disease-2019 (COVID-19) 20 days back and was treated with methylprednisolone 1-2 mg/kg intravenous (i.v.) in two divided doses and enoxaparin 0.5 mg/kg subcutaneously twice daily for 10 days. The patient presented with complaints of headache, postnasal drip, pain in the right orbit, and epistaxis with black eschar for the past one week.

On diagnostic nasal endoscopy, deviated nasal septum to left with right inferior turbinate hypertrophy and black eschar was noted in the nasal cavity. The MRI paranasal sinuses was performed in three orthogonal planes using T1 weighted, T2 weighted, Short Tau Inversion Recovery (STIR), Diffusion-Weighted Imaging (DWI) and post contrast T1 fat sat sequences. Hypointense to isointense signal on T1 weighted and T2 weighted sequences, a hyperintense signal on STIR sequence noted in all paranasal sinuses. On DWI restriction [Table/Fig-1] and decreased Apparent Diffusion Coefficient (ADC) values (mean: was 0.495×10^{-3} mm^2/s) [Table/Fig-2] were noted in bilateral sphenoid sinuses. On contrast, no enhancement was noted.

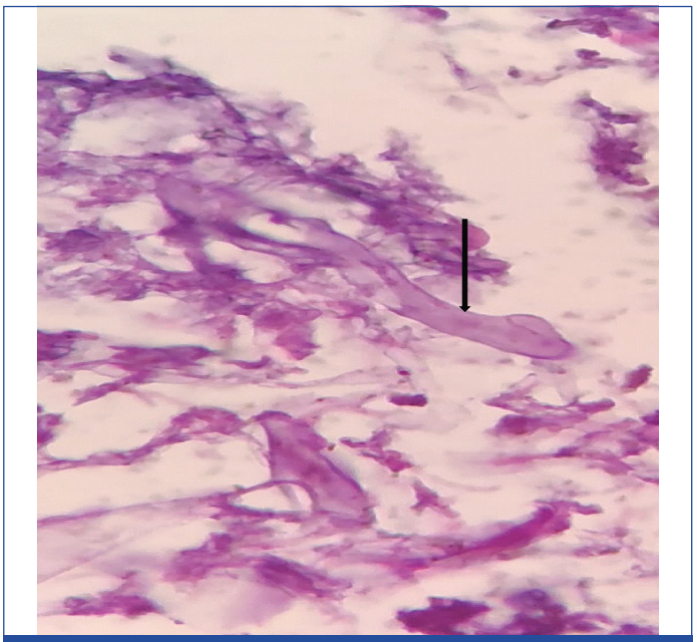


[Table/Fig-1]: Diffusion-Weighted Imaging (DWI) showing restricted diffusion in bilateral sphenoid sinuses.

Histopathological examination of transnasal sphenoid sinus biopsy showed broad, non septate hyphae with irregular wide branching fungal elements [Table/Fig-3] and extensive inflammatory infiltrate, suggesting mucormycosis as the causating agent.



[Table/Fig-2]: Corresponding Apparent Diffusion Coefficient (ADC) image showing decreased ADC values (0.407×10^{-3} mm^2/s) in bilateral sphenoid sinuses.



[Table/Fig-3]: Haematoxylin-eosin (H&E) stained section of sphenoid sinus mucosa showing broad, non septate hyphae with irregular wide branching fungal elements (Black arrow H&E 40X).

Intracranial spread of mucormycosis is better depicted on contrast enhanced T1-weighted imaging by showing meningeal enhancement, infarcts, abscesses. It is also useful for the identification of the cavernous portion of internal carotid artery invasion [2]. Diffusion restriction is seen in intracranial extension and sinuses with decreased ADC values in case of sinonasal mucormycosis whereas bacterial

sinusitis does not show any restriction on DWI unless associated with thick purulent secretions or complicated subperiosteal abscess. Diffusion restriction in mucormycosis cases may be due to ischaemia and necrosis of tissue with debris and fungal elements itself which is resulting from the angioinvasive nature of fungal infection [3].

The diagnosis of mucormycosis can be endorsed by aggressive clinical features of the immunocompromised host, however, it must be confirmed by histopathological examination of transnasal or cerebral biopsy [4].

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