

Isolated Cerebral Mucormycosis

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Abstract

Isolated cerebral mucormycosis without rhino-orbital focus is an extremely rare but life-threatening infection of central nervous system that most commonly found in intravenous drug abuser. We present a case of isolated cerebral mucormycosis diagnosed by open biopsy and treated with amphotericin B.

Introduction

Infection with fungi of the Mucoraceae family is rare, which is unfortunately, frequently fatal.¹¹ Multiple clinical syndromes including rhinocerebral, pulmonary, gastrointestinal, cutaneous and disseminated forms have been described.^{4,9,13} Most mucormycosis cases are rhinocerebral in which the infection ascends from the nasal passage to sinuses or orbit and then sometimes to the brain.^{5,9,10} Open head injury can also implant this fungus directly into the brain.¹² Isolated cerebral mucormycosis is a rarely encountered fungal infection seen in diabetic, immunocompromised patients or patients with a history of intravenous drug abuse (IVDA).⁶

Case Report

This 61-year-old woman with insulin dependent diabetes mellitus was admitted with a history of headache and left sided weakness for 15 days. The family members reported that the patient

had complained of few episodes of headache associated with nausea and vomiting in last few months. General physical examination was normal. There was no evidence of nasal inflammation or infections. There was no history of intravenous drug use or head trauma or immunosuppression. Neurological examination was normal except left sided weakness (4/5). Laboratory findings showed a white blood cell count of 10000/mm³ with 64% neutrophils, 34% lymphocytes, hemoglobin of 12.7 g/dL, hematocrit of 32%, and platelet count of 212,000/mm³. Routine blood chemistry values were within normal limit except hyperglycemia (24mmol) and HbA1c 11.9. Magnetic resonance (MR) images of brain showed right frontal lobe enhancing lesion with nodular leptomeningeal enhancement in right fronto-temporo-parietal region associated with gyral and subcortical edema. (Fig.1) Open biopsy was performed via frontoparietal craniotomy.

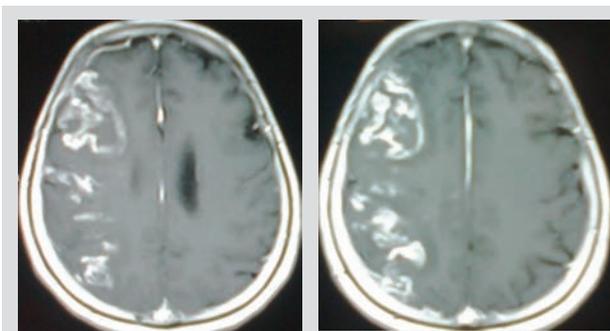


Fig-1: Contrast enhanced T1-weighted magnetic resonance images show enhancing lesions in right fronto-temporo-parietal region with gyral and subcortical edema.

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Isolated Cerebral Mucormycosis

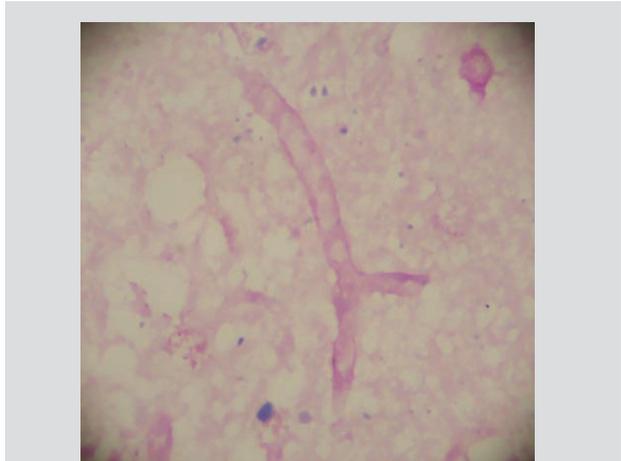
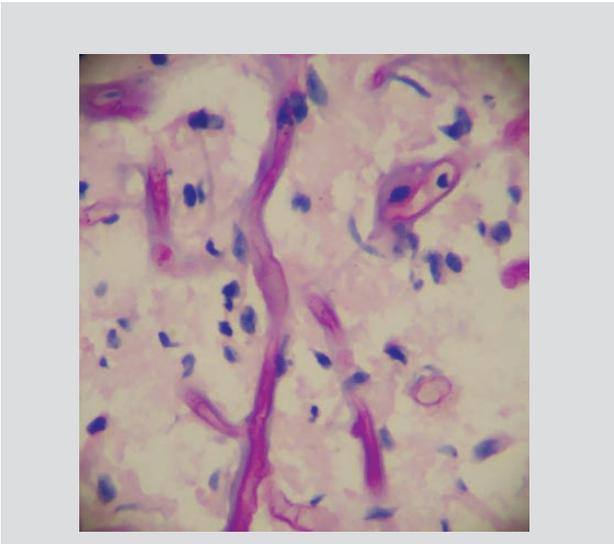
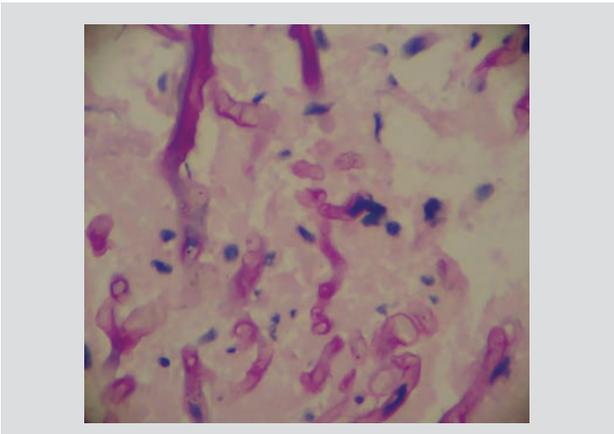
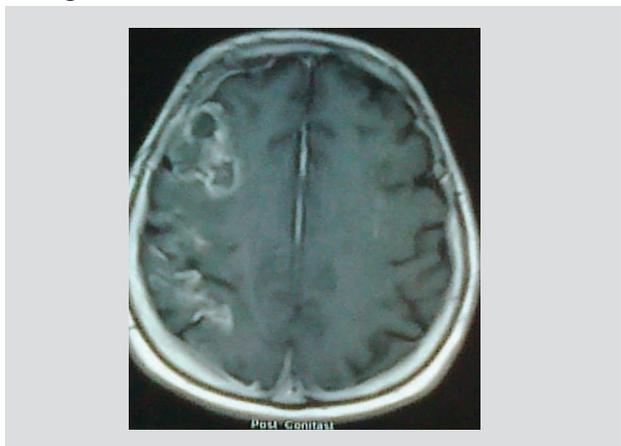
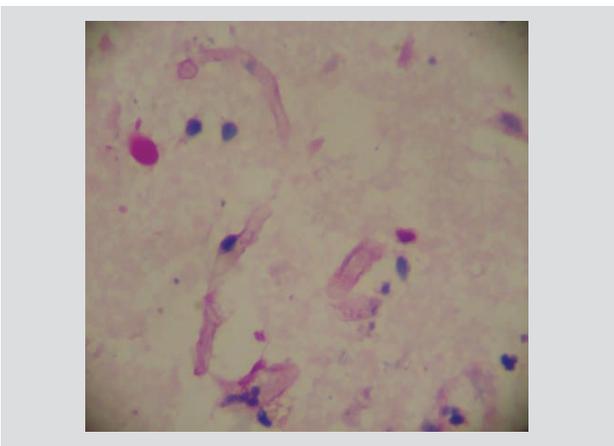


Fig-2. Microphotographs (A, B) showing many hyphae with irregular widths and right-angle branching are noted in the necrotic tissue as well as within the multinucleated giant cells (A: H&E $\times 200$; B: H&E $\times 400$). PAS (C : $\times 400$) and GMS (D : $\times 400$) stains highlight fungal hyphae also.



Treatment with intravenous amphotericin B (1 mg/kg/d) was initiated after histopathologic diagnosis. But fungal cultures were not performed. The patient's hyperglycemia was controlled with insulin. For the period of 12 weeks of therapy, the patient received an accumulated dose of 4.8 g of amphotericin B without complication. Follow-up MR Images showed gradual reduction in the size of cerebral lesions (Fig. 3). The patient was discharged from the hospital and returned to independent living.



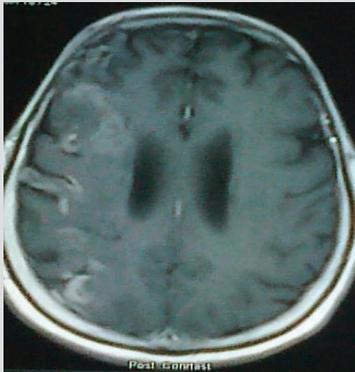


Fig 3: Follow up Contrast T1-weighted magnetic resonance images after 2 weeks show markedly decreased pathological enhancement.

Discussion

Mucormycosis is a fungal infection most often develops in individuals with immunologically compromising conditions.^{1,8,12,13} Risk factors contributing to CNS mucormycosis are diabetes mellitus, malignancy, and chronic immunosuppression.^{12,13} Particularly, when diabetes mellitus is poorly controlled that causes acidosis, it becomes a high risk factor as it relates to cellular immune dysfunction.⁴ Isolated cerebral mucormycosis with no evidence of regional or systemic disease is a very uncommon entity and IVDA history is the most important risk factor for isolated cerebral mucormycosis.^{2,12}

The invasion pattern of cerebral mucormycosis is somewhat predictable and may occur by direct invasion or hematogenous spread.⁹ The primary route of rhinocerebral mucormycosis is through direct extension from the nose and/or paranasal sinuses, underscoring the organism's predilection for the nasal cavity and paranasal sinuses. This is followed or accompanied by subsequent spread to the orbits after crossing

bony partitions.⁷ Invasion into the orbit causes orbital cellulitis, proptosis, ophthalmoplegia and eventually blindness.^{8,10} The pathogens are prone to invade and spread along blood vessels, particularly arteries. The fungus proliferates within the internal elastic lamina, dissecting it away from the media. As the hyphae penetrate the endothelium, thrombotic arteritis, infarction, hemorrhage, and extensive necrosis follow.¹³

The diagnosis is based on a clinical picture revealing the invasive course of the disease and is confirmed by biopsy, where the specimen usually show broad, non-septate hyphae with branching at right angles and invading tissue. Culture can be used to identify the specific species although the cultures may fail to grow despite the presence of widespread and aggressive disease.¹⁰ Treatment consists of systemic antifungal therapy, radical surgical debridement and correction of any underlying condition.^{3,8} Systemic antifungal chemotherapy, limited to amphotericin B, has significantly improved the survival rates of patients with mucormycosis.¹³ Therapeutic response to antifungal therapy alone is unreliable. Surgical procedures play a role in diagnosis, early and, if required, repeated surgery has been necessary to treat extensive disease.¹³ The case reported herein deserves attention because it was associated with big size lesion in the cerebrum, no history of IVDA, no history of head trauma, negative for human immunodeficiency virus, and successful treatment result. Diabetes mellitus may have also been associated with this rare disorder in this patient.

Conclusion

Isolated cerebral mucormycosis with no evidence of regional or systemic disease is a

Isolated Cerebral Mucormycosis

very uncommon clinical entity. This entity is different from the rhinocerebral mucormycosis. Early diagnosis, surgical removal of devitalized infected tissue, intravenous amphotericin B therapy, and correction of any underlying condition represent a viable treatment option for this rare disorder.

References

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