

## POSTERIOR FOSSA FUNGAL RINGS IN IMMUNOCOMPETENT HOSTS- REVIEW OF 2 UNUSUAL CASES

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### ABSTRACT

Fungal infections of the central nervous system (CNS) are almost always a clinical surprise. Their presentation is subtle, often without any diagnostic characteristics, and they are frequently mistaken for tuberculous meningitis, pyogenic abscess, or brain tumour. With high index of suspicion, an aggressive approach to diagnosis, and rapid vigorous therapy may we hope to alter the clinical course in this group of patients. In general, fungi are organisms of low pathogenicity, emerging as opportunistic organisms thriving in an immunocompromised host; however, some will infect even immunocompetent hosts. We present two unusual fungal infections in immunocompetent hosts.

### KEYWORDS

Immunocompetent, Fungal, Ring Enhancing Lesions, Aspergilloma, Histoplasmosis.

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**INTRODUCTION:** Fungi are common in the environment, but only a few are pathogenic. In general, fungi are organisms of low pathogenicity, emerging as opportunistic organisms thriving in an immunocompromised host; however, some will infect even immunocompetent hosts. Aspergillosis is an infection of tissues or cavities by fungi of the genus *Aspergillus*. In the nervous system, the infection can be found in the cerebral parenchyma, the meninges or the vascular system. Fungal infections of the central nervous system (CNS) are almost always a clinical surprise. Their presentation is subtle, often without any diagnostic characteristics, and they are frequently mistaken for tuberculous meningitis, pyogenic abscess, or brain tumour. With high index of suspicion, an aggressive approach to diagnosis, and rapid vigorous therapy may we hope to alter the clinical course in this group of patients.<sup>(1)</sup>

**CASE 1:** We had a 17-year-old female patient presented to us with headache and intermittent vomiting. There were no other complaints. There was no history of seizures, visual disturbances, or bowel and bladder disturbances. She was nondiabetic and was immunocompetent. On neurological examination, patient's higher mental functions were well preserved without cranial nerve deficits. She was having left-sided cerebellar signs. MRI Brain with contrast showed multiple conglomerated ring enhancing lesions in left cerebellum. Patient was operated keeping tuberculoma as diagnosis. Postoperatively patient improved well; however, histopathology was suggestive of histoplasmosis. Patient was started on antifungal agent injection voriconazole.

Patient's consciousness deteriorated on postoperative day 10. MRI brain with contrast was suggestive of appearance of new lesions in right middle cerebellar peduncle and dissemination in CSF (CSF picture showed proteins 180, sugar 10 and no wbc's). Patient was started on injectable amphotericin B and was managed in neuro-ICU. Gradually, patient's condition improved. Followup MRI brain after 15 days showed decrease in size of lesion in right cerebellar peduncle and disappearance of other lesions. Patient was conscious, oriented at discharge with significant improvement in ataxia.

**CASE 2:** A 55-year-old female patient was referred to us from our medical department with history of sudden onset altered sensorium. Patient was nondiabetic and immunocompetent. Neurologically, patient was conscious, drowsy. MRI brain with contrast T1 weighted images showed ring enhancing lesion in left cerebellum with oedema and compression of 4<sup>th</sup> ventricle. Patient was operated with differential diagnosis as tuberculoma. Postoperatively, patient's condition improved significantly. Postoperative CT brain was suggestive of complete excision of lesion. Histopathology was suggestive of Aspergilloma. Patient was started on antifungal injectable voriconazole. On postoperative day 14, patient's condition deteriorated, CSF was showing high proteins- 230, low sugar- 25 and minimal wbc's suggestive of fungal meningitis. On radiological examination, there was no hydrocephalus or recurrence/spread of fungal lesion. Despite giving antifungal, patient expired.

### DISCUSSION:

**Aspergillosis:** *Aspergillus* is a ubiquitous fungus, common pathogenic species being *Aspergillus fumigatus* or *Aspergillus flavus*. The clinical manifestations are produced by both tissue invasion and the host immune response. The clinical manifestations and disease severity are dictated by

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the immunologic state of the patient. Infection of the CNS by *Aspergillus* follows haematogenous seeding (lungs and heart being the most common primary sites) or direct inoculation into the CNS during surgical procedures or spread from contiguous structures like paranasal sinuses, mastoid and middle ear. The infection in the nervous system can be found in the cerebral parenchyma, meninges or the vascular system. *Aspergillus fumigatus* is the most common species to cause invasive disease. Intracranial aspergillomas are solid, firm intracerebral lesions that exhibit florid granulomatous inflammation without suppuration observed in otherwise immunocompetent individuals. The frontal and temporal lobes are the most common sites for intracerebral granuloma formation presenting as space-occupying lesions. CNS aspergillosis including invasive form, brain abscess are reported rarely from India.<sup>(2)</sup>

For treating intracranial aspergilloma, the commonly recommended treatment regime is surgery followed by oral voriconazole. Despite high doses of antifungal drugs and extensive surgery, very high mortality rates have been reported ranging between 28% and 85.7%. (Srinivasan) Studies by Coleman et al & Schwartz et al's indicated that neurosurgical intervention was associated with improved outcome with a median observation period of 390 days. Detailed analyses of these patients with aspergilloma abscess have shown that the combination of radical resection of aspergilloma including its abscess capsule have proven to be effective in improving the long term outcome when combined with antifungal drugs rather than mere aspiration of the abscess cavity where the capsule is left in situ. In chronic invasive intracranial aspergilloma in an immunocompetent patient, it is suggested that radical excision of the intracranial aspergilloma combined with oral antifungal drug belonging to triazole group that can be either itraconazole or voriconazole given for a period of 6 months is likely to improve the long term outcome.<sup>(3)</sup>

**Histoplasmosis:** Histoplasmosis caused by *Histoplasma capsulatum* found in soil. *H. capsulatum* may cause meningitis in 5-25% cases. Central nervous system histoplasmosis was observed in 10-20% of all disseminated cases. Brain abscesses are infrequent, present as miliary non-caseating granulomas, sometimes with a larger size called histoplasmoma.<sup>(4)</sup>

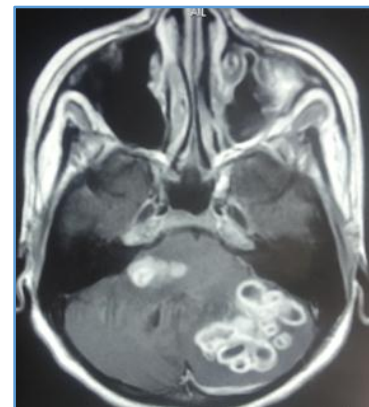
The optimal treatment for CNS histoplasmosis is unknown. Therapy should be aggressive and prolonged. Liposomal amphotericin B treatment is recommended at 3–5 mg/kg/day for a total dose of 100–150 mg/kg for 6–12 weeks. Then, treatment could be switched to high-dose fluconazole (600–800 mg daily, adjusted for renal function) or itraconazole (200 mg 2 or 3 times daily), to complete at least 1 year of therapy. Hydrocephalus occasionally complicates *Histoplasma* meningitis. In such cases, shunt placement should be delayed until the patient has received at least 2 weeks of amphotericin B treatment to reduce the likelihood of colonisation of the newly placed shunt material. The response to therapy of focal brain or spinal cord lesions, so-called histoplasmomas, is variable. Although most cases

have been treated with amphotericin B, success has been reported with itraconazole or fluconazole. After 2–4 weeks of amphotericin B treatment, MRI of the brain should be repeated. If the patient's condition responded clinically and the lesions improved, as seen on MRI, then treatment with amphotericin B could be replaced with itraconazole, 200 mg 2 or 3 times daily; or fluconazole, 600–800 mg daily.(CID) Surgery is indicated for tissue diagnosis and in patients with neurological deterioration.

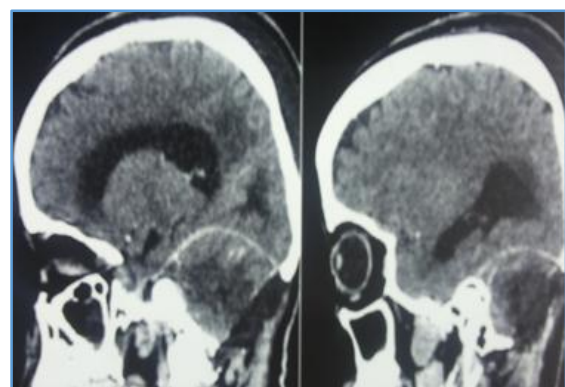
**CONCLUSION:** A possibility of a fungal granuloma should be thought of in the differential diagnosis of an intracranial solitary mass even in an immunocompetent host. A perioperative squash smear or a frozen section should be sought after in the evaluation of this disease.

In both our cases, a fungal pathology was not suspected and was not in our thought spectrum because of the assumption of the granuloma to be of tuberculous origin, which is more common in this part of the world. It is also considered as the first and foremost in the differential diagnosis of a chronic granulomatous disease. The immune status of the patient was also in favour of a tuberculoma rather than a fungal granuloma, which is more common in an immunocompromised state.

#### Case 1:



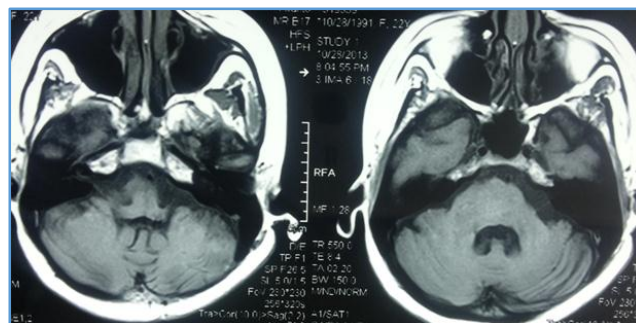
**MRI Brain T1 Weighted Images  
Showing the Lesion in Left Cerebellum**



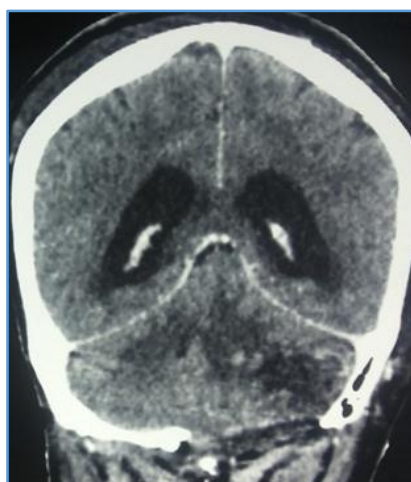
**Sagittal Cuts of Post-operative CT scan**



**Pre-operative CT Brain of Same Patient Showing the Lesion**

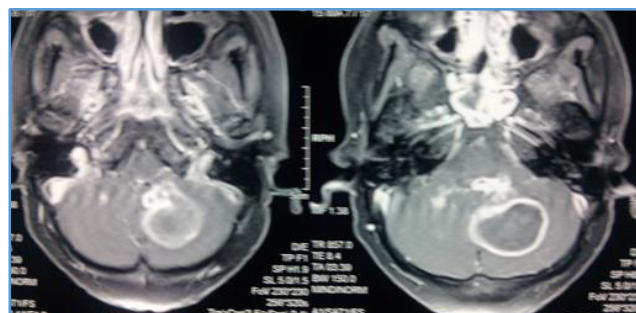


**MRI Showing Disappearance of Lesion after Medical Management**

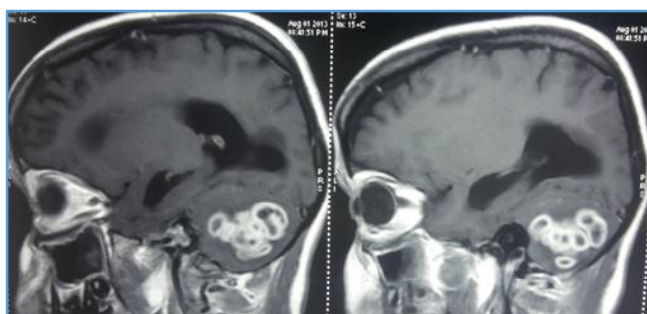


**Post-operative CT Brain Showing Complete Excision of Lesion**

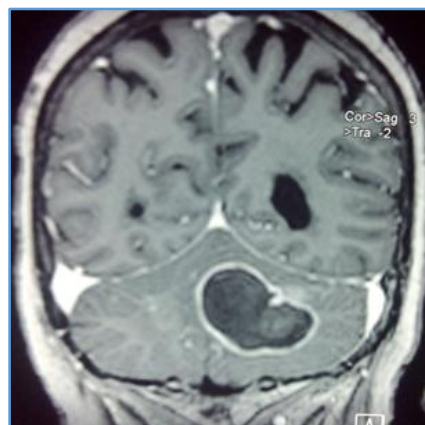
**CASE 2:**



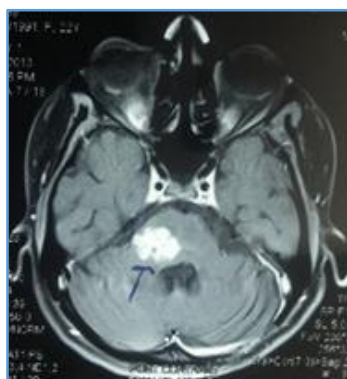
**Pre-operative MRI Brain Showing Ring Enhancing Lesion in Left Cerebellum**



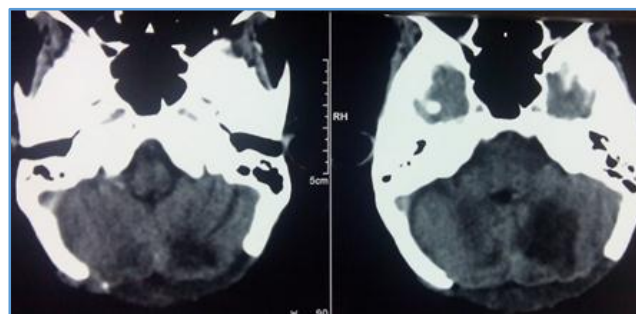
**Sagittal Cuts of Pre-operative MRI**



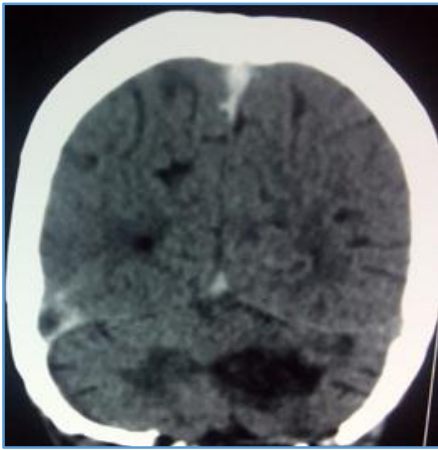
**Coronal Images of Preoperative MRI**



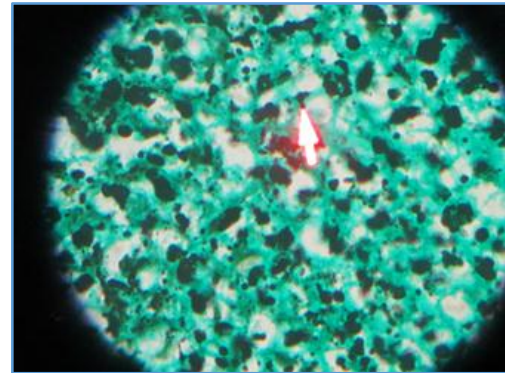
**Post-operative MRI Brain after 10 days Showing New Lesion in Right Cerebral Peduncle**



**Post-operative CT Brain with Contrast**

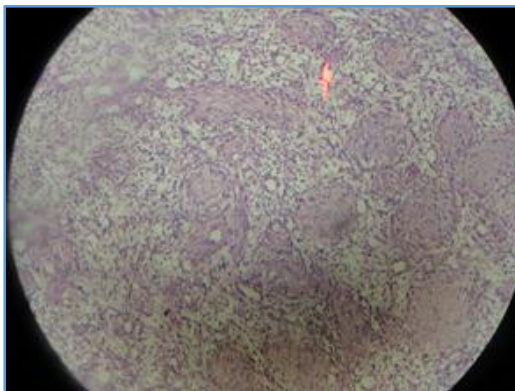


**Coronal Images of Post-operative CT Brain**

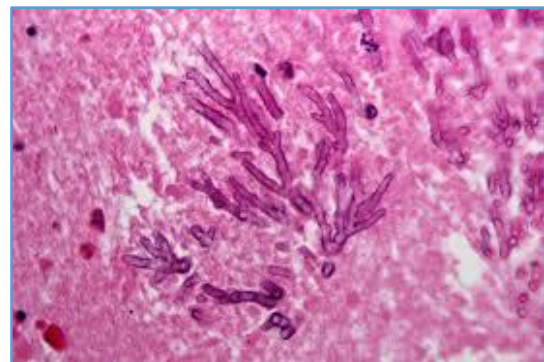


**Histopathological Images of Histoplasmosis Patient on GM Staining**

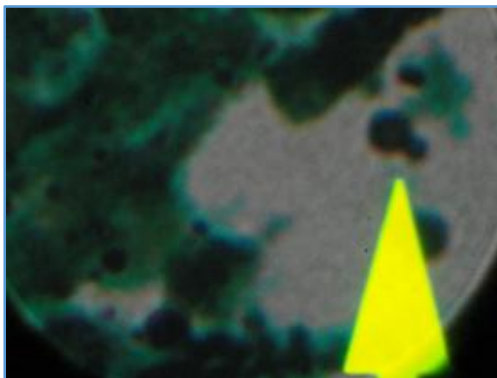
**Histopathological Images of Histoplasmosis patient (3 images):**



**Histopathological Images of Histoplasmosis Patient-H/E staining**



**Histopathology Slide of Aspergilloma Patient Showing Hyphae on H/E Staining**



**Histopathological Images of Histoplasmosis Patient GM staining**

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