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*Case Report*
**Bangladesh Journal of Infectious Diseases**
***December 2017, Volume 4, Number 2***
ISSN (Online) 2411-670X; ISSN (Print) 2411-4820
DOI: http://dx.doi.org/10.3329/bjid.v4i2.37696

# Cerebral Aspergillosis in an Immunocompetent Patient: A Case Report

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[**Received:** 1 October 2017; **Accepted:** 15 November 2017; **Published**: 1 December 2017]

**Abstract**

*Aspergillus* is a fungus found in the environment. In an immunocompetent person, inhalation of spores may cause localized infection. Invasive aspergillosis has a poor prognosis. We describe a case of cerebral aspergillosis in an immune competent patient. A 30-year-old man was admitted with seizures and headaches. Magnetic resonance imaging (MRI) of the brain showed contrast enhancing lesion at the suprasellar region. Excision biopsies showed granulomatous reactions, mixed inflammatory infiltration, fibrosis, and necro-purulent material mixed with fungal hyphae featuring acute-angle branching and septation, which was compatible with aspergillosis. Amphotericin B was begun. The results of testing for human immunodeficiency virus (HIV) was negative. Unfortunately the patient died on twentieth post-operative day. Most cases of invasive aspergillosis show that this organism is pathogenic in immunocompromized patients; however, some case reports show that invasive aspergillosis may not be so rare in immunocompetent patients. In these patients, virulent and drug-resistant forms of *Aspergillus* may be responsible for the disease, and treatment with antifungal agents is often ineffective, so that surgical excision is required. [*Bangladesh Journal of Infectious Diseases 2017;4(2):52-55*]

**Keywords**: Aspergillosis; brain abscess; meningitis; immunosuppression; immunocompetence; mycoses; voriconazole; amphotericin B

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**Conflict of interest:** There is no conflict of interest to any of the authors of this article.
**Contribution to authors:** Haroon K, Taher T, Alamgir A, Reza MA, Sharmin S contributed in patient management up to article write up. Sharmin L, Amin F, Hossain SS authors revised and corrected the paper.
**How to cite this article:** Haroon K, Taher T, Alamgir A, Reza MA, Sharmin S, Sharmin L, Amin F, Hossain SS. Cerebral Aspergillosis in an Immunocompetent Patient: A Case Report. Bangladesh J Infect Dis 2017;4(2):52-55


## Introduction

Fungal infections of the CNS are challenging to treat and their optimal management requires knowledge of their epidemiology, host characteristics, diagnostic criteria, and therapeutic options. *Aspergillus* and *Cryptococcus* species predominate among fungal infections of the CNS[1].

Aspergillosis is a relatively infrequent opportunistic infection of the CNS that may account for around 10% of all fungal infections of the CNS and it is associated with high mortality and morbidity[2]. The involvement of the CNS may occur either by direct propagation from sinuses, nose or ear canal, or by hematogenous spread from a primary pulmonary focus[2].

The most common port of entry is by inhalation of the spores, causing sino-pulmonary diseases. The other less common port of entry is direct implantation of spores when there is breach in mucocutaneous barriers as in burns and sites of catheter insertion or trauma[3]. According to Jae-Chang Lee, Central nervous system (CNS) *Aspergillus* abscess is very rare in immunocompetent patients and a potentially life threatening disease that is usually misdiagnosed because its presentation is similar to that of a tumor[4]. Invasive aspergillosis has a poor prognosis, particularly in critically ill patients with cerebral involvement. The mortality rate of cerebral aspergillosis 63%[5]. According to the Infectious Diseases Society of America, *Aspergillus* species continue to be an important cause of life threatening infection. Voriconazole is recommended as primary therapy for CNS aspergillosis (strong recommendation; moderate-quality evidence). Lipid formulations of AmB are reserved for those intolerant or refractory to voriconazole[6]. Fasciano et al[7] suggested Amphotericin B as the antifungal drug of choice for treatment of aspergillosis and can be delivered either intravenously or intrathecally.

**Case Presentation**

A thirty year old non diabetic, non-hypertensive man was admitted to the Department of Neurosurgery, National Institute of Neurosciences & Hospital, Dhaka, Bangladesh hospital with the complaints of progressively severe headache, nausea, vomiting and deteriorating vision for four months.

Headache was gradually aggravating in the morning without any precipitating factors, but it was accompanied by nausea and vomiting. He never had a convulsion or lost consciousness. On examination, his higher psychic function was normal. His cranial nerves were intact except 2nd cranial nerve. There was no perception of light or projection of rays. His pupils were bilaterally dilated. He had no motor or sensory deficit and also no signs of cerebellar dysfunction or meningeal irritation. All blood counts were normal.

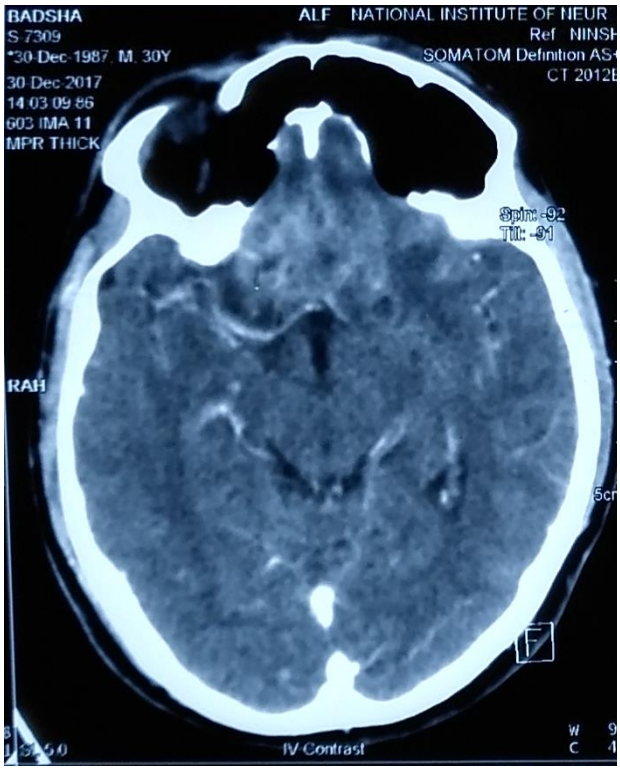


**Figure 1: CECT Contrast enhancing lesion of Suprasellar region**

The chest x-ray was normal. The serological test of the patient for HBV and HIV were negative. CT scan (Figure 1) showed a contrast enhancing lesion in the sellar and supra sellar region extending up to the tuberculum sella.

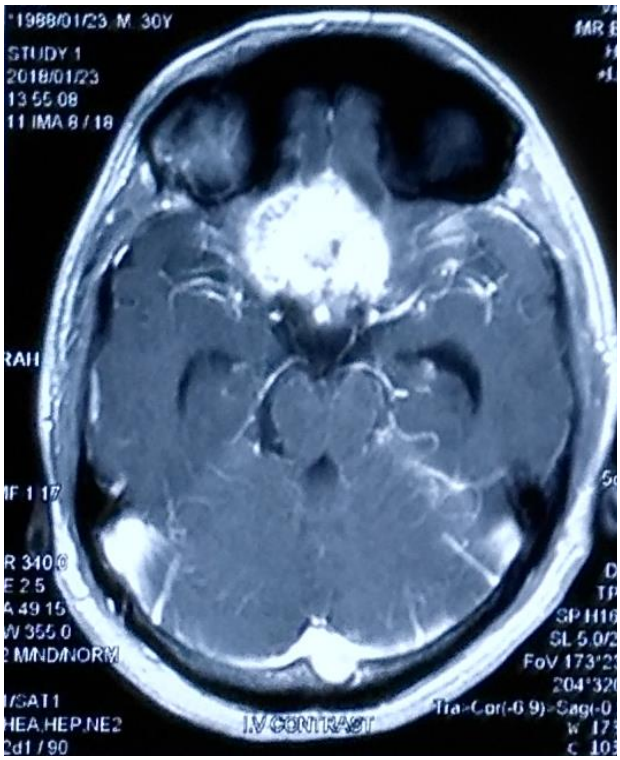


**Figure 2: MRI of brain with contrast**

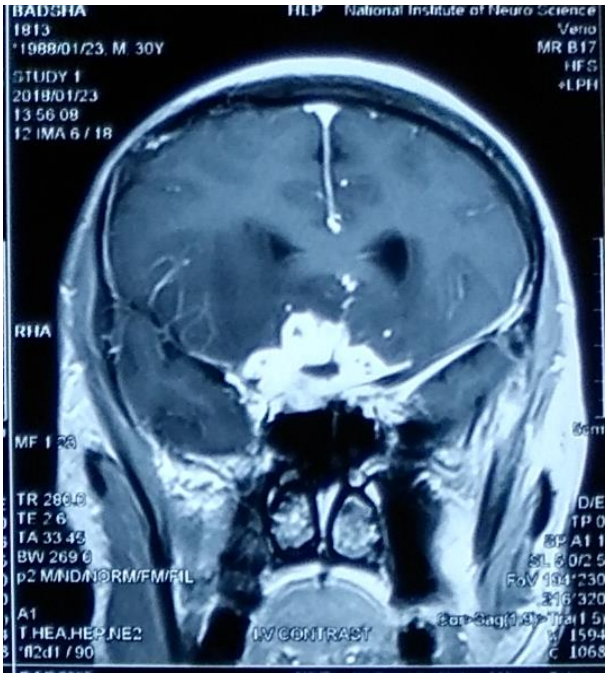


**Figure 3: MRI of Brain with Contrast in Coronal Section**

MRI of brain (Figure 2) showed a brilliant contrast enhancing lesion at the suprasellar and tuberculum sella attached with the basal dura. The patient was diagnosed as tuberculum sella meningioma. The differential diagnosis was supra sellar tuberculoma.

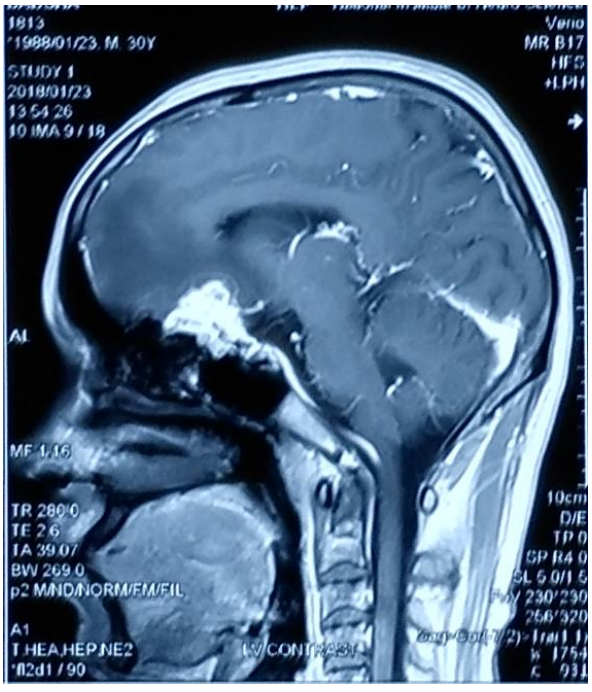


**Figure 4: MRI of Brain with Contrast Sagittal Section**

After admission to the hospital suddenly his headache and vomiting increased with deterioration of consciousness. The patient underwent emergency EVD following which his GCS had improved. Then definitive surgery was performed. The tumour was approached through a sub-frontal craniotomy. After retraction of the frontal lobe, the lesion was found to be firm to hard in consistency and grayish in colour. There was neither a cleavage plane nor any display of caseous material. It was moderately vascular. Severe adhesion with the surrounding tissue was encountered. Subtotal resection was done. Dura was closed water tight. Wound was closed in layers. The histopathological report revealed fungal colonies surrounded by many acute and chronic inflammatory cells. The fungi show narrow hyphae, branching at acute angles with terminal spore. Some of the fragments show glial tissue at the periphery. No evidence of tumour or malignancy was seen. Their comment was: fungal granuloma compatible with aspergillosis (Figure 3).

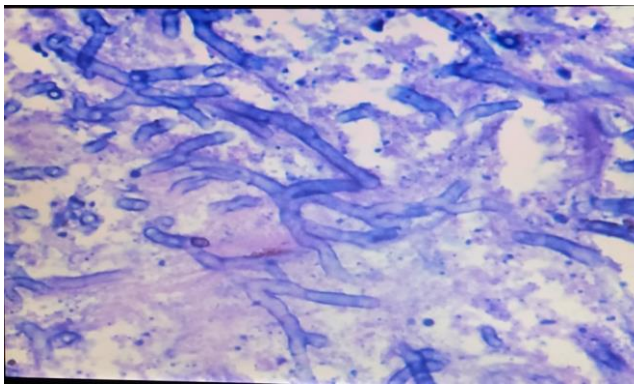

**Figure 5: Fungal hyphae with spores on Histopathology (H&E preparation)**

Amphotericin B was started immediately following receipt of the histopathology report. At first, his condition remained unchanged and his stitches were taken off on the 9th POD. After 14th POD, his level of consciousness deteriorated gradually. Unfortunately, despite appropriate medical and surgical treatment, the disease progressed and the patient eventually died 20 days after surgery.

## Discussion

CNS aspergillosis is rare. However, the number of reported cases increased significantly in the last decade. *Aspergillus* can reach the CNS by three different routes. The first is by hematogenous spread from a remote extracranial focus. The second is by extension from a contiguous extracranial location, and the third is direct introduction of *Aspergillus* by a neurosurgical procedure iatrogenically[4]. In immunocompetent patients, virulent and drug-resistant forms of *Aspergillus* may be responsible for the disease, and treatment with antifungal agents is often ineffective, so that surgical excision is required.

In immunocompetent patients, this fungus spreads from sites near the brain, such as the sinuses[5]. Artico stated the factors positively influencing the effectiveness of therapy to be evidence of single, isolated lesion without dissemination; paucity of neurologic symptoms; early diagnosis; preventive amphotericin B administration in patients at risk for aspergillosis[8]. In the brain, contiguous spread occurs from granulomatous lesions in the paranasal sinuses and middle ear leading to the development of chronic granuloma with dense fibrosis in adjacent structures of the brain, like the frontal lobe, from paranasal sinuses. Rhinocerebral granulomas occurs commonly in immunocompetent hosts. Rhinocerebral lesions are usually diagnosed early due to easier sampling from paranasal sinuses and have less mortality[9]. In this patient the lesion was adjacent to the paranasal sinuses. Administration of broad-spectrum antibiotics over a 3-month period has been shown to predispose to central nervous system aspergillosis[10].

The treatment of choice for sino-orbital aspergillosis or sphenoidal is surgical excision of the aspergilloma, granulation tissue of the involved sinus for ventilation and drainage, as early as possible. Furthermore, there was shown a beneficial effect of pre-surgical treatment with antifungal therapy. In patients for whom total removal cannot be achieved, intensive therapy with antifungal agents must be started immediately[11].

## Conclusion

CNS aspergillosis is rare but very serious, with a high mortality. A combination of surgical resection and antifungal therapy does not guarantee a good outcome. The prognosis of the patients depends on early diagnosis and prompt aggressive treatment. Therefore, suspicion of aspergillosis at nearby areas of paranasal sinuses should be borne in mind.

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