Acute Hydrocephalus Due to Intraventricular CNS Aspergillosis: A Case Report

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Abstract- The immunosuppressive state after organ transplantation leads to infectious complications responsible for high mortality rate. Fungal infections account for 5% of all infections in Renal Transplantation (RT) recipients. A 53-year-old man was admitted with acute loss of consciousness. He had a history of renal transplantation 1 month before admission. Brain CT showed acute hydrocephalus with periventricular edema. A right frontal external ventricular drain was inserted urgently. One day later the consciousness further decreased, and CT scan showed unilateral left lateral ventricle dilatation and a hyperdense mass at the septum pellucidum. The patient was operated via endoscopic trans-middle frontal sulcus approach. The interventricular septum was pushed contralaterally, and a very adherent mesh-like thick layer covered the surface of lateral ventricle and foramen of Moro. The Monro foramen was opened, and septostomy was done. The mass inside the septum was found posterior to the foramen, punctured, and partially removed. Histopathological study revealed aspergillus infection of the lateral ventricles. CNS Aspergillosis should be considered in the differential diagnosis of altered consciousness among immunocompromised hosts. This report further implies that isolated ventricular involvement by aspergillus infection may be considered as the cause of hydrocephalus in immunocompromised patients.

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Keywords: Aspergiloosis; CNS infection; Hydrocephalus; Immunosuppression; Renal transplant

Introduction

The immunosuppressive state after organ transplantation leads to infectious complications responsible for a high mortality rate. Fungal infections account for 5% of all infections in Renal Transplantation (RT) recipients. Aspergillus species are filamentous fungi frequently causing fungal infections in RT recipients. Lungs and paranasal sinuses are the usual portals of entry from where it disseminates to other organs (1). Intracranial fungal infections are being identified more frequently due to the increased incidence of acquired immune deficiency syndrome (AIDS), better radiological investigations, more sensitive microbiological techniques, and better critical care of moribund patients (2). Many clinical pictures have been described for CNS aspergillosis, including skull base, vascular, and parenchymal forms. In this article, we report a rare case of isolated interventricular aspergillosis presenting with acute loss of consciousness due to hydrocephalus one month after renal transplantation.

Case Report

A 53-year-old man was admitted with acute loss of consciousness without fever and with normal vital signs. On admission, he had a Glasgow coma scale of 6 with bilateral papilledema without any lateralized neurological deficit. He had a history of renal transplantation 1 month before admission, which had an uneventful postoperative course.

Laboratory evaluations were unremarkable except for elevated serum creatinine (4.24 mg/dl) and urea (273 mg/dl). A brain CT scan showed dilatation of the ventricular system with significant periventricular edema (Figure 1).

A right lateral ventricular draining catheter was inserted emergently for treatment of acute communicating hydrocephalus. CSF analysis revealed 9 WBC/µL, 4000 RBC/µL, protein 11 mg/dl and glucose 93 mg/dl and the direct microbial smear was negative. His level of consciousness remained unchanged after the operation. One day after surgery the level of consciousness decreased (GCS=4) and the pupils became

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anisocoric (Left fixed mydriasis). Brain CT scan revealed unilateral left frontal horn dilation due to obstruction at the left foramen of Monro with a hyperdense mass at the septum pellucidum just posterior to the Monro foramina (Figure 2A and B). The patient was operated via endoscopic trans-middle frontal sulcus approach. The interventricular septum was pushed contralaterally, and a thick mesh-like layer covered the surface of the lateral ventricle and septum pellucidum that was adherent to the foramen of Moro. The foramen was opened after piece-meal resection of the coating layer. The mass inside the septum was found posterior to the foramen, punctured, and partially removed, which contained mucinous necrotic debris. Finally, a septostomy was done, and the debris was removed by copious irrigation.

Figure 1. A. axial brain CT scan without contrast showing severe hydrocephalus with remarkable periventricular edema. B. the non-contrast enhanced CT showing significant resolution of brain edema after insertion of the ventricular draining catheter. Left unilateral ventriculomegaly is noted with displacement of the septum pellucidum. An isodense mass is noted at the septum just posterior to the foramen of Monro (the red arrow)

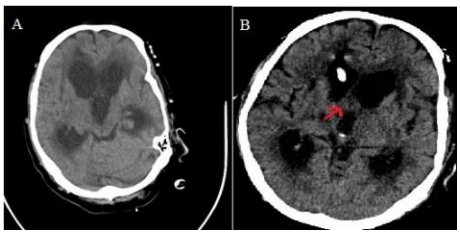

Figure 2. Aand B) the non-contrast enhanced CT showing significant resolution of brain edema after insertion of the ventricular draining catheter. Left unilateral ventriculomegaly is noted with displacement of the septum pellucidum. An isodense mass is noted at the septum just posterior to the foramen of Monro (the red arrow)

Histopathologic examination showed fibrinoid exudates bearing many neutrophil leukocytes and fungal organisms (Figure 3 A-B). The fungal hyphae were made up of dichotomously branched and septated tubes with parallel walls (Figure 3 C-D). These microscopic features distinguish Aspergillus species from Zygomycetes (Mucormycosis) (Figure 3).

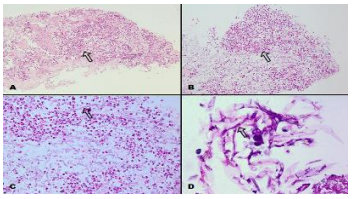

Figure 3. A) The submitted sample is mainly composed of fibrinoid exudates (pink) and leukocytes (arrow). H and E stain ×100. B) The leukocytes are predominantly neutrophils (arrow). H and E stain ×200**.** C) Higher magnification discloses easily discernible fungal hyphae (arrow). H and E stain ×400**.** D) Septate and dichotomously branched fungal hyphae are better seen in specially stained sections (arrow). PAS stain ×1000

Anisocoria resolved just after the surgery, and consciousness improved slightly (GCS=6). The ventricular dilatation was resolved completely in the postoperative brain CT scan (Figure 4). He had a further elevation of serum creatinine level and unfortunately died during hemodialysis on the third postoperative day.

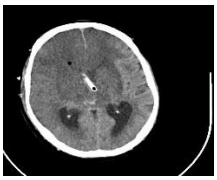

Figure 4. Axial brain CT scan showing complete removal of the lesion and resolution of the hydrocephalus

Discussion

Aspergillus is a saprophytic opportunistic ubiquitous fungus found in soil, plants and grows as a mold on decaying vegetable matter (3). Disseminated aspergillosis is more common among immunocompromised hosts and commonly seen as an opportunistic infection in patients with AIDS. CNS aspergillosis is seen after different types of organ transplantation. It is also reported in neutropenic patients with acute leukemia and patients of glioblastoma multiforme on steroid therapy (4).

CNS affection by aspergillus may have a variety of presentations, including skull base involvement by contagious spread from paranasal sinuses. The simultaneous orbital extension may cause proptosis, ocular palsies, visual deterioration, and chemosis. Vascular involvement can occur due to direct invasion of vessels at the skull base and/or in the form of septic emboli to the more distal branches. Mycotic aneurysm formation may be seen which can result in occurrence of subarachnoid hemorrhage. Patients are often afebrile or have only a low-grade fever. Their symptoms are usually

those of a cerebral mass lesion such as headache, vomiting, convulsions, hemiparesis, cranial nerve deficits, paralysis, and sensory impairment. Less commonly they may present with features typical of meningitis (5). Profuse sinonasal or intracranial bleeding may be seen in patients with vascular invasion and extensive vessel wall necrosis (6).

Aspergillosis is diagnosed on direct examinations and culture. However, the diagnosis of CNS aspergillosis remains difficult.

Aggressive neurosurgical intervention is indicated for surgical removal of Aspergillus abscesses, granulomas, and focally infarcted brain with the management of the underlying risk factors at the same time. Intravenous administration of Amphotericin B combined with oral flucytosine and treatment of the primary source of the infection is the mainstay of the management (2).

Whenever possible, immunosuppressive therapy should be tapered or discontinued in the compromised host with CNS infection. Unfortunately, rejection is often concomitant with infection, requiring higher doses of immunosuppressive agents. In patients with cancer, systemic disease is frequently stable when CNS infection develops, and it is usually possible to postpone systemic chemotherapy (2).

The prognosis for CNS aspergillosis is poor, with most reported cases being fatal (7). In some studies, an aggressive surgical approach in immunocompetent patients reduced the mortality from 64-39% (8,9). Intracerebral aspergillosis is frequently fatal in immunocompromised patients, with only 12 reported cases of successful treatment (10).

In our case, we encountered acute communicating hydrocephalus due to CNS involvement without any visible mass at the first CT scan which turned to obstructive univentricular dilation after insertion of the ventricular catheter. One month before admission he received a renal transplant. In his pre-transplant medical workup, he did not have any findings of systemic involvement. We believe that immune dysfunction due to prolonged renal failure was the underlying risk factor for CNS aspergillosis in this patient. The clinical presentation in our case was not typical of CNS aspergillosis, and according to our review of the literature such a clinical picture has not been reported for CNS aspergillosis till now. The only previously reported case of isolated intraventricular aspergillosis is a case of fungal mycetoma in the fourth ventricular cavity that caused obstructive hydrocephalus (11).

Aspergillosis should be considered in the differential diagnosis of altered consciousness among immunocompromised hosts. This report further implies that isolated ventricular involvement by aspergillus infection may be seen in immunocompromised patients. By this report, we raise the index of suspicion about CNS aspergillosis when facing with acute hydrocephalus in an immune defecient patient.

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