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An unusual case of dual co-infections in an Immunocompetent person

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Abstract

Rhino cerebral Mucormycosis and aspergillosis are uncommon but lethal diseases in people with immunocompromised persons. These infections typically spread through inhalation , but they can also enter through ingestion and trauma. Here, presenting a case of mucormycosis and aspergillosis in a 24-year-old immunocompetent male patient with no known co-morbidities who presented initially with complaints of headache and on subsequent investigations revealed both mucormycosis and aspergillosis involving the paranasal sinuses, nose, and cerebrum. The patient was treated with amphotericin B and Posaconazole.

Keywords: Mucormycosis, Aspergillosis, Immunocompetent,Headache

Introduction

Aspergillus infections and rhino-cerebral-orbital mucormycosis are both highly lethal and aggressive fungal illnesses[1]. A higher prevalence is seen in patients with untreated diabetes, trauma, burn wounds, corticosteroid medication, HIV infection, kidney disorders, or hematological malignancies. Among the aspergillus species, Aspergillus fumigatus and flavus are the most frequently discovered in human diseases[2]. There are two types of fungal rhinosinusitis: invasive and non-invasive. The non-invasive types are allergic Aspergillus sinusitis and aspergilloma. Limited or fulminant invasive Aspergillus infections that affect numerous organs are possible[3]. When compared to infections like aspergillosis or candidiasis, mucormycosis is less frequent. However, the prevalence of mucormycosis is higher[4] in people with risk factors such diabetes, covid 19 sufferers, and bone marrow transplantation. Pulmonary mucormycosis, rhino-cerebral, and maxillo-facial symptoms are the most frequent clinical signs. Rhino-cerebral mucormycosis typically begins in the nose or paranasal sinuses and spreads to the orbit, cribriform plate, or brain over the orbital apex through the oral cavity. There are no specific symptoms other than fever, rhinorrhea, and headache. Intranasal black necrotic crusts may be discovered[5]. At the time of presentation, the symptoms are advanced and already demonstrate complications such intracerebral spread of the brain abscess, proptosis, meningitis, or orbital involvement of the disease with ophthalmoplegia[6].

Case Report

A 24 year old male presented with complaints of diffuse and continuous type of headache since one month and giddiness since seven days and he has no known co morbidities .On examination there was no focal neurological deficit and other systemic examination was

normal. Laboratory investigations revealed haemoglobin 15.7 gm/dl, total white blood cell count 7200/mm3 with neutrophil 66, lymphocyte 24, eosinophil 4%, and monocyte 6%. Platelet was adequate (2.7 lacs/mm3). Fasting blood sugar was 99 mg/dl and post prandial blood sugar was 114 mg/dl. HbA1C was 5.4 on admission. HIV negative. The patient did not take any medications during this period. On the day of admission Magnetic Resonance Imaging of brain plain and contrast with orbit plain was done revealing basal enhancing lesions in left anteromedial temporal region and para nasal sinusitis and doubtful abnormal soft tissue in baso frontal region region of left orbital apex -suggestive of Atypical meningioma or infective etiology most likely fungal. On fundus examination left sided established papilledema was present.Patient has undergone Functional Endoscopic Sinus Surgery (FESS) and sinus biopsy was taken and sent which revealed fungal elements in KOH mount and Aspergillus flavus in culture and aspergillosis and mucormycosis in histopathology. Patient was started on Inj. Liposomal Amphotericin B 5mg/kg/day ,T.Posaconazole 300 mg OD, Inj .Levetiracetam 500 mg BD, Inj.Ceftriaxone 1gm BD. After 30 days ,repeat Magnetic Resonance Imaging of brain plain was done revealing moderate reduction in dural basal enhanced soft tissue and significant reduction in left temporal lobe. The patient was continued on the same medications.On day 36 ,he developed sudden weakness of right upper and lower limbs with deterioration of GCS and Magnetic Resonance Imaging of brain with angiography with venography was done revealing multiple patchy and extensive acute non haemorrhagic infarcts involving left fronto parieto temporal and left occipital lobe and poor to absent flow in left middle cerebral artery and its cortical branches. In spite of all measures, his condition was deteriorated and succumbed to death.

Figure 1

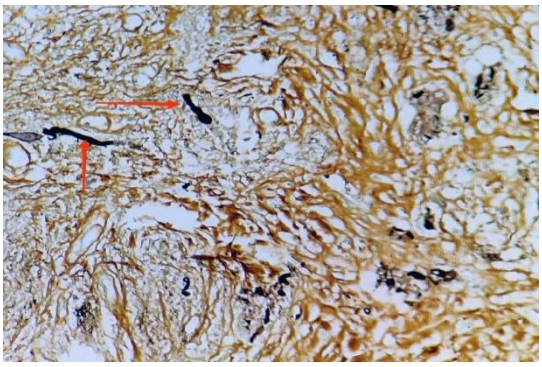

Figure 2

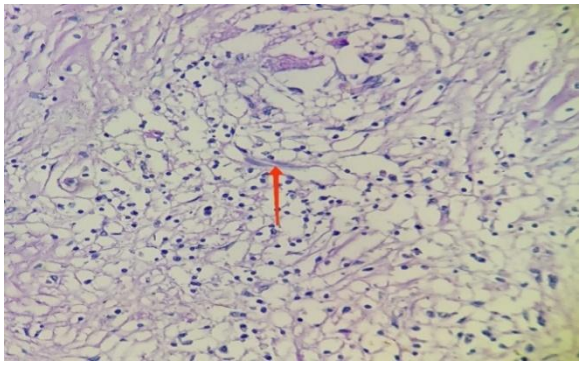

Figure 3

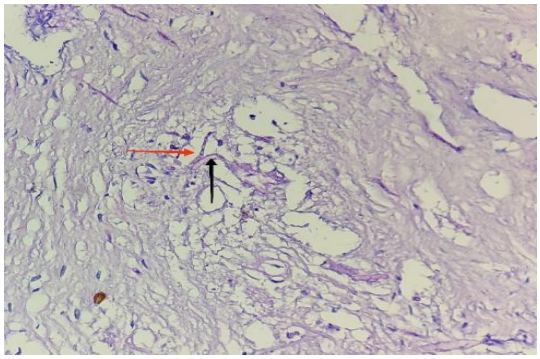

Figure 4

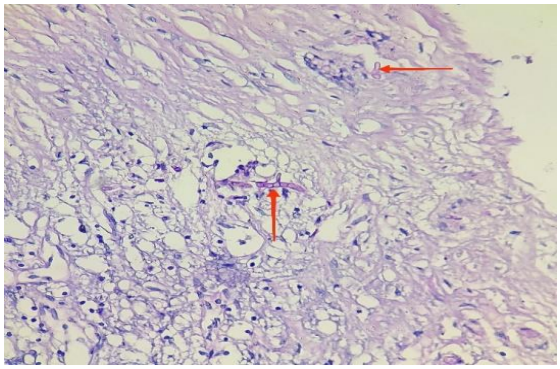

Figure 1- GMS (Grocott methenamine silver)stain highlighting fungal elements,

Figure 2- PAS stain showing broad aseptate fungal hyphae -S/O mucormycosis,

Figure 3- GMS stain showing septate fungal hyphae -S/O aspergillosis**,**

Figure 4- PAS stain highlighting both septate and aseptate hyphae showing both Aspergillosis and mucormycosis

Discussion

Aspergillosis and mucormycosis are filamentous fungi that are more commonly seen in immunocompromised patients than immunocompetent ones. 20–40% of patients are expected to survive [7]. Invasive fungal rhinosinusitis in immunocompetent patients has been reported relatively infrequently [8]. It is highly uncommon and there are very few reports of mucormycosis and aspergillosis involving the rhino orbito cerebral region in immunocompetent patients. It is challenging to diagnose since specific symptoms that would be indicative of a fungal sinus infection are not present. There are three main types of aspergillosis: invasive, non-invasive, and non-invasive destructive type[9]. Aspergilloma or allergic Aspergillus sinusitis are two non-invasive types. True fungal tissue invasion represented by the invasive form can be extremely aggressive and fatal, or it can be slowly progressing and damaging. Because of its potent toxin, Aspergillus Flavus among them is particularly harmful to the paranasal sinuses and oral cavity. Based on the disease's anatomical location, invasive mucormycosis is classified. They are gastrointestinal, disseminated, disseminated, pulmonary, rhino-cerebral, cutaneous, and miscellaneous[10]. For both varieties of fungi, a fulminant process with rapid infiltration of the surrounding tissues, such as the orbit and the anterior skull base, is characteristic. The lethality of the fungus increases after the hyphae penetrate blood arteries, where thrombi are generated and cause embolism and necrosis. In healthy individuals, the invasive variant is uncommon. Early CT scanning is crucial for detecting bone damage. MRI aids in the early detection of any spread into the meninges or internal parenchyma as well as cerebral vascular blockage. Histological analysis is used to confirm the diagnosis. Each type of fungus has a unique hypha. Aspergillus has septate hyphae that branch at 45° angles, whereas Mucor has massive, non-septate hyphae that are broad with right angle branching. Treatment for mucormycosis involves reversing risk factors and underlying diseases, medicinal therapy, and surgical debridement. Although both types of amphotericin B are effective against mucor, the liposomal version has fewer side effects at the infusion site, greater CNS penetration, and less nephrotoxicity. Both aspergillosis and mucormycosis can be treated with oral posaconazole. For invasive aspergillosis, treatment with antifungal medications and concurrent surgery might last anywhere between a few weeks and many months. Aspergillus infection has a better prognosis for survival than mucormycosis. A terrible prognosis is associated with aspergillosis and mucormycosis co-infection.

Conclusion

Rhino-orbital-cerebral mucormycosis and aspergillosis are successfully treated with early diagnosis, systemic therapy with antifungal medications, surgical intervention, and control of underlying illnesses. When treating mucormycosis, surgical intervention should be more extensive and practical than when treating aspergillosis.

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Conflict of Interest: None declared.

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