



A silent cerebral abscess in a patient with mucormycosis: A case report

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ABSTRACT

Coronavirus disease 2019 (COVID-19) is one of the most significant medical problems of the century. Mucormycosis infection is one of the devastating problems associated with this disease. Brain abscess associated with these conditions may have very poor prognosis, and prompt diagnosis as well as treatment of it is of paramount importance. In this study, we introduce a diabetic middle-aged man who was treated with corticosteroids due to COVID-19, and affected by rhinocerebral mucormycosis. Due to eye chemosis, brain MRI was performed which showed a silent abscess in temporal lobe with no neurological symptoms. After ten weeks of treatment, serial endoscopic sinus surgery and antifungal therapy, the invasive fungal sinusitis and brain abscess healed without debilitating sequela. We introduced this case as an educational example of brain involvement in mucormycosis. Although very rare, due to possible fatal sequelae, brain abscess should be considered as a probable complication of mucormycosis even if the patient has no neurological symptom.

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Introduction

Acute respiratory syndrome, caused by the SARS-CoV-2, is one of the most significant public health emergencies of the century. Many treatments have been suggested since the disease outbreak; however, prevention and symptomatic treatment is considered the main treatment in these patients (1).

Mucormycosis is a deadly infection that affects most immunocompromised people, especially diabetic patients (2). Factors such as brain or eye involvement and severe immune compromise increase mortality due to mucormycosis by about 50-80% (3). Mucormycosis is transmitted by inhalation, inoculation, or ingestion of spores. It often involves sinonasal system after inhaling fungal species. In such cases, it may spread intracranially or to the ophthalmic system.

The main symptom of mucormycosis, tissue necrosis, is a late symptom. Mucormycosis is

challenging to diagnose, often leading to severe morbidity or death. This increases the need for timely diagnosis and management (4).

Brain abscess as a complication of mucormycosis has been reported in the literature (5-7), but to the best of our knowledge, asymptomatic brain abscess due to mucormycosis has not been reported in the literature so far. In this report, we present a COVID-19 associated mucormycosis with an asymptomatic brain abscess treated with no neurological sequelae.

Case report

A 48-year-old man was admitted to a tertiary referral hospital with anosmia, palate paresthesia, and symptoms of chronic rhinosinusitis. The patient was diabetic and had hyperlipidemia for 12 years, and had been taking metformin

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plus glibenclamide. After admission, he was treated with insulin. Other symptoms were slight blurred vision, proptosis, but no signs of chemosis.

He had a history of Covid-19 infection two weeks ago which was treated with antiviral drugs and dexamethasone. On the admission day, the patient's vital signs were normal, and he was conscious. The left middle concha was necrotic and had mucopurulent secretions on anterior rhinoscopy.

The patient underwent endoscopic sinus surgery on the day of admission and surgical debridement

of necrotic tissues was performed. In the biopsy specimen report, evidence of necrotic tissue with mucormycosis was reported.

Then, the patient underwent endoscopic sinus surgery several times to eradicate the disease. Also, due to eye involvement, the patient received three injections of retrobulbar amphotericin on 4, 7, and 9 days after admission. Due to eye involvement, a brain MRI was performed, which showed evidence of a brain abscess in the temporal lobe (Figure 1).

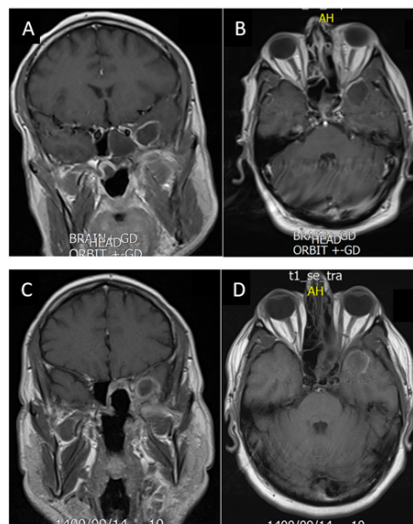


Figure 1: Low signal focal point in T1 with restriction and ring enhancement in anteromedial of left temporal lobe associated with vasogenic edema: A) coronal section before treatment, B) Axial section before treatment, C) Coronal section after treatment, and D) Axial section after treatment

Thus, cefepime, metronidazole, and vancomycin were initiated for the patient. According to the neurosurgery consultation, he was not a candidate for surgery due to the reduction in the abscess size. The patient had a marked decrease in the abscess size and edema after treatment. Finally, the patient was discharged in good general condition three months after admission.

Discussion

Due to delay in diagnosis and insufficient treatment, aggressive nature of mucormycosis may easily lead to serious morbidity or mortality. Rhinogenic symptoms is the most common clinical manifestation of mucormycosis (8). Although the most common causes of the brain abscesses are microbial, mucormycosis can spread from the paranasal sinuses to extra-nasal sites such as the skin, eye and rarely central nervous system (9).

Mucormycosis may spread to the brain in 13.3-22% of patients with blood disorders (10). Nevertheless, brain abscess has been only reported in 2% of cases with mucormycosis (11). The main treatment for mucormycosis is combined treatment of invasive sinus surgery and antifungal therapy

as well as improving the underlying disease (12). Despite aggressive surgical and medical treatment, mucormycosis has been a life-threatening disease with a poor prognosis. In addition, surgery is sometimes impossible in cases of disseminated mucormycosis or infected parts that are not easy to access, such as the brain (13).

COVID-19 infection alone causes severe lung disease followed by interstitial alveolar damage, increasing the risk of invasive fungal infections. COVID-19 virus can also disrupt immune regulation, which includes a decline in T lymphocytes, which in turn weakens the immune system (14). Due to predisposing conditions, such as those mentioned above, early diagnosis of mucormycosis is essential for timely treatment and a better prognosis for the patient (15, 16).

In one case, a 70-year-old man with rhinocerebral mucormycosis with cerebral abscess was treated with endoscopic endonasal cranial surgery (17). In another case, a middle-aged man developed ophthalmoplegia and left hemiparesis due to an abscess in the right frontal lobe. He was treated with antifungal therapy, and the patient was discharged in a healthy state (18). All these cases presented with

neurologic signs, but the brain abscess of our patient did not have neurological signs and was diagnosed accidentally on brain MRI.

The main treatment for central nervous system (CNS) involvement is amphotericin-B. The medication should be continued until the desired response is achieved and the disease stabilizes, which may be long lasting. Treatment should be continued until the clinical signs of infection have resolved and the radiological features of the active infection have resolved along with a reduction in risk factors, such as hyperglycemia, immunosuppression, and steroid use (19). In a similar study, patients with severe COVID-19 and long-term diabetes were diagnosed with moderate COVID-19 infection after one month of hospitalization. In this study, the patient was on non-invasive ventilation (NIV) for three days and then discharged but referred to the emergency department with a seizure complaint.

After brain MRI, the sinus-orbital infection was diagnosed with brain involvement, and the patient was treated with antiepileptic and antifungal drugs. In patients with COVID-19 and immune system diseases, the possibility of fungal infection should be considered (20).

Conclusion

Brain abscess as a complication of mucormycosis, albeit infrequent, has high mortality; then it should be considered in patients with mucormycosis, even in patients with no neurological sign.

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