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RESEARCH ARTICLE

ISOLATED CEREBRAL MUCORMYCOSIS FOLLOWING COVID 19 INFECTION PRESENTING AS STROKE

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ABSTRACT

Mucormycosis is a life threatening infection due to spores of phycomycetes fungi. Rhino orbital involvement with subsequent intracranial extension is the most commonly affected region. COVID 19 infection was associated with a surge of rhino orbital cerebral mucormycosis. Isolated cerebral mucormycosis is a rare clinical entity. We report a patient who following COVID infection, presented as stroke, but on further evaluation was found to have isolated cerebral mucormycosis. Case report- A 62 year old lady who following COVID 19 infection, presented with right upper and lower limb weakness on awakening. MRI brain was suggestive of acute ischemic infarct in centrum semiovale. Repeat MRI brain after 2 days showed increasing size of the lesion with microhemorrhages and peripheral contrast enhancement suggestive of fungal etiology. There was no evidence of rhino orbital disease clinically or in imaging. Patient underwent stereotactic biopsy that confirmed the diagnosis of mucormycosis. Conclusion- Isolated cerebral mucormycosis can present as stroke. Since stroke following COVID infection is a frequent occurrence, absence of rhino orbital involvement in a case of cerebral mucormycosis requires a high index of suspicion for diagnosis.

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INTRODUCTION

Mucormycosis is a life threatening condition caused by spores of phycomycetes fungi that belong to order Mucorales.[1] Although mucormycosis can affect multiple organs in an immunocompromised individual, it preferentially involves orbit, nasal cavity and sinus.[1] The organ involvement by mucormycosis is influenced by the degree of immune suppression in an individual. Rhino orbital and cerebralmucormycosis (ROCM) is more commonly seen amongpatients with uncontrolled diabetes mellitus, compared to that in malignancy and transplant recipients [1, 2] COVID 19 pandemic in India, particularly the second wave, saw a sudden surge in ROCM.[3] Post COVID mucormycosis with cerebral involvement has been associated with foci of infection in rhino orbital region. Commonest intracranial complications of post COVID mucormycosis include cavernous sinus involvement with invasion of internal carotid artery with subsequent thrombosis and infarction, perineuritis, cerebritis as well as abscess.[4] Isolated cerebral mucorycosis (ICM) is rare.[1] We report a patient with post COVID mucormycosis with pure cerebral involvement without rhino orbital foci whose clinical presentation was that of a stroke.

CASE REPORT

A 62 year old hypertensive lady presented with weakness of right upper and lower limb and inability to comprehend speech immediately on awakening in the morning. She was diagnosed with COVID infection 15 days prior to the onset of limb weakness and was treated with steroids for five days. There was no history of intravenous drug abuse or head trauma. During treatment she was diagnosed with Diabetes mellitus and started on oral hypoglycaemics for the same.

On examination, patient was conscious, unable to speak or comprehend commands, had gaze preference to left. Motor examination revealed hypotonia as well as complete hemiplegia of right upper and lower limb. MRI brain showed T2 hyperintensity in left centrum semiovale with diffusion restriction suggestive of acute ischemic infarct. Patient was started on antiplatelet agents. However, in next two days, patient's sensorium worsened and she became stuperous. A repeat imaging (Figure 1) revealed increasing size of the lesion with diffusion restriction, foci of blooming and peripheral enhancement in contrast sequences. However, there was no evidence of sinusitis.

A possibility of intracranial abscess was considered. Patient underwent biopsy for the same. KOH preparation showed broad, aseptate hyaline fungi with wide angle branching. Microscopic examination of the biopsy specimen showed edematous cerebral cortical tissue with neutrophilic inflammation, infarction and thrombosed vessels and numerous broad aseptate hyphae in parenchyma (Figure 2,3). Findings were consistent with intracranial mucormycosis. Fungal culture of biopsy tissue showed growth of mucor species after 7 days of aerobic incubation in Sabaroud dextrose agar. Patient was advised antifungal therapy. But relatives wanted to pursue treatment elsewhere and subsequently was lost to follow up.

DISCUSSION

ICM is extremely rare. In a review of 929 cases of mucormycosis, 30 % of these cases had cranial involvement and out of these cases, 16% cases were isolated intracranial mucormycosis. ICM has been commonly reported in intravenous drug users and rarely associated in the setting of hematological malignancies, pulmonary infection and open head injuries.[1, 5] Lobar and deep cerebral involvement in ICM has been reported in only 15 % of patients with ICM while rest of the patients had basal ganglia involvement.[6]Predilection of basal ganglia involvement in ICM has been particularly observed among ICM in intravenous drug users.[2] Lobar involvement, particularly in frontal lobe is a feature of intracranial granulomatous mucormycosis. [2] Mucormycotic abscess have also been observed in parietal and occipital regions. Predisposition towards involvement of basal ganglia can be explained on account of high levels of iron in the basal ganglia and the diameter of striatal arteries favouring growth and spread of mucor sporangiospores.[7] COVID infection facilitates co infection with fungal illnesses such as mucormycosis and aspergillosis by provision of hypoxic environment, elevated serum ferritin levels, acidosis, and decreased phagocytic activity as a result of immunosuppression that enables of mucormycosis infection and growth.[8] To our knowledge, ICM has not been reported following COVID 19 infection. Infarction and abscess involving cerebral parenchyma secondary to mycormycosis develop following invasion of orbital, facial structures or cribriform plate, invasion of blood vessels in maxillary and ethmoid sinus. Angioinvasion by fungal hyphae initially leads to thrombotic occlusion and hyperplasia of intima. This leads to ischemia and necrosis of brain parenchyma which provides a congenial hypoxic environment favouring Mucorales entry and proliferation.[2]Our patient had no clinical or radiological evidence of sinus or nasal or orbital involvement of mucormycosis. The absence of foci of infection in rhino orbital region and location of mucormycosis in deep cerebral region implies haematogenous spread of infection[9] via perivascular channels in the presence of intact sinuses which might explain the etiology of isolated cerebral mucormycosis in our patient. ICM presents with fever, headache, altered sensorium, focal weakness and cranial nerve deficits.[6, 9] Like that seen in our patient, initial presentation as stroke has also been reported.[5, 7]Clinical presentation of ICM can also mimic meningoencephalitis, intracranial space occupying lesion [5] and ventriculitis leading to hydrocephalus.[6]

Athough, patient's history was suggestive of stroke, the MRI features that gave clues against the diagnosis of stroke was the peripheral enhancement as well as presence of microhemorrhage within the circumscribed lesion. Imaging findings in ICM include diffusion restriction, homogenous or peripheral enhancement of lesion.[10] Peripheral enhancement in contrast sequences is a feature of late cerebritis. [2] Presence of susceptibility artefacts in MRI brain indicates fungal elements and hence an invasive process. [2, 6] Strokes have been frequently reported in COVID 19 infection as a result of procoagulant state.[11]Hence, development of acute hemiparesis in a patient with recently diagnosed COVID infection and lack of clinical evidence of rhino orbital involvement, made the clinical diagnosis of acute ischemic stroke very likely. It was the disproportionate worsening of sensorium and repeat imaging, that gave rise to suspicion of a fungal abscess as a likely etiology. In our patient, stereotactic biopsy confirmed the diagnosis. However, negative stereotactic biopsy in ICM is not unusual. In such an instance, open biopsy will help clinch the diagnosis.[9]

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