Post-COVID-19 Cerebral Pheohyphomycosis due to *Rhinocladiella mackenziei*: A Middle Eastern Replica of Post-COVID-19 Mucormycosis?

Dear Editor,

Healthcare-associated infections (HAIs) are not uncommon after COVID-19. Kubin *et al*. reported that the incidence of post-COVID-19 HAIs was around 12%.[1] Out of these, 57% were bacterial and 19% were fugal.[2] Although candidemia was the most common fungal infection, the Indian population witnessed the storm of "mucormycosis."[2] The risk factors and the pathophysiology of post-COVID-19 mucormycosis are well described in medical literature.[2] Recently, we came across a case of "cerebral pheohyphomycosis (CH)" after COVID-19.

Our patient was a 53-year-old female of Arabic ethnicity. She was morbidly obese and had multiple comorbidities. Two months before the present clinical encounter, she was admitted to our hospital with severe COVID-19. She was successfully treated with favipiravir, tocilizumab, and methylprednisolone. After about 1 month, she presented to us with clinicoradiological features of organizing pneumonia. We started a steroid (prednisolone) treatment for her. After 15 days, she reported with facial palsy and left hemiparesis. Neuroimaging was suggestive of right frontal abscess [Figure 1]. She was operated by a neurosurgeon; decompressive craniectomy and debridement of necrotic tissue were done. Brown-colored pus was removed, and pus on macroscopic examination revealed many groups of branching filaments (fungus). We started her on a dual antifungal (liposomal amphotericin-B and caspofungin). Later, the pus on culture revealed the fungus "*Rhinocladiella mackenziei* (RM)," so the dual antifungal was continued for 2 weeks. This was followed by oral voriconazole for another 2 weeks. We followed her progress for 6 months. She is in stable condition and cured of post-COVID-19 sequelae.

CH is a fungal infection of the brain caused by environmental dematiaceous fungi belonging to the order *Chaetothyriales*.[3,4] It is a rare opportunistic infection with mortality rate close to 100%.[3,4] Three species of *Chaetothyriales* order namely *Cladophialophora bantiana*, *Exophiala dermatitidis*, and RM are highly neurotropic and mostly responsible for CH.[3,4] CH due to RM is restricted to the Middle East with most of the cases reported in Saudi Arabia.[3,4] The dry and hot climate is said to be responsible for this endemicity.[3,4] CH due to RM is common in immunocompromised hosts. Around 35% of the cases were reported in immunocompetent patients.[3,4] Cerebral infection is usually secondary to pulmonary infection.[3,4] The clinical feature and differential diagnosis of CH are comparable to that of intracranial space-occupying lesions.

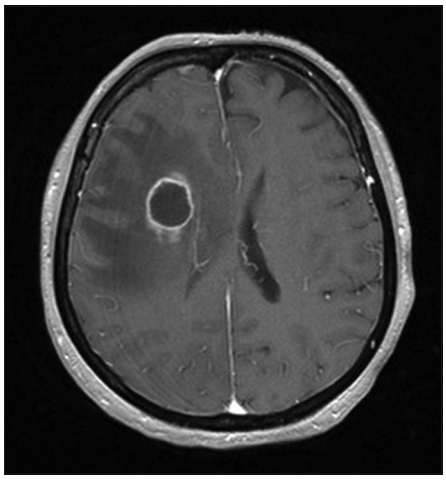

Figure 1: Magnetic resonance imaging of brain (T1 with contrast) showing right frontal abscess with the enhancing rim

Magnetic resonance imaging brain with contrast is the investigation of choice that shows ring-enhancing lesions.[3,4] The definitive diagnosis requires isolation and identification of the fungus from tissue or body fluids by culture. In culture, fungus typically forms slow-growing, pigmented colonies.[3,4] Treatment consists of surgery and antifungal therapy.[3,4] Complete excision of abscess is recommended whenever feasible.[3,4] The combination of antifungal drugs for prolonged duration is recommended.[3,4]

In our patient, the morbid elements that were observed in the pathophysiology of post-COVID-19 mucormycosis might have played a role in the development of CH. Laiq *et al*. from Oman also reported a case of post-COVID-19 CH.[5] Such a case raises the question of whether post-COVID-19 CH is a Middle Eastern replica of post-COVID-19 mucormycosis, which has comparable agent, host, and environmental factors. Therefore, we emphasize more observation, reporting, and study of such cases.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form, the patient has given her consent for her images and other clinical information to be reported in the journal. The patient understands that her name and initials will not be published and due efforts will be made to conceal identity, but anonymity cannot be guaranteed.

Research quality and ethics statement

The authors followed applicable EQUATOR Network (http://

www.equator-network.org/) guidelines, notably the CARE guideline, during the conduct of this report.

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Conflicts of interest

There are no conflicts of interest.

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