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Brain Abscess after COVID-19: Case Report

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Abstract

As the COVID-19 pandemic progresses, complications and unusual presentations of the disease have been described. Among them, the involvement of distinct parts of the neuroaxis. We report a rare case of brain abscess in elderly after SARS-Cov-2 infection readmitted in our health unit. Patient was treated with ceftriaxone, metronidazole and vancomycin with good clinical and therapeutic response. The satisfactory conduct of the case was only possible by the involvement of a multiprofessional team, which sought early diagnosis, surgical intervention and adequate duration of treatment.

Keywords

Brain Abscess, Biopsy, COVID-19

1. Introduction

The first case of coronavirus disease 2019 (COVID-19) was diagnosed in Brazil on February 25, 2020. Subsequently, the disease spread rapidly and the country became the first in number of cases and deaths in Latin America [1]. Initially only described as a disease of pulmonary involvement, with the follow-up of more cases, it was observed that it is a multi-systemic pathology with renal, digestive and cardiac and neurological complications [2].

Literature proposes that SARS-CoV-2 reaches the central nervous system by two main routes. The first by systemic vascular dissemination and the second through the cribiform blade of the ethmoidal bone. The virus invades neural tissue for its neurotropic properties and binds and interacts with angiotensin-converting enzyme 2 (ACE 2) receptors in the capillary endothelium [3].

In this report, we present a rare case of brain abscess in an elderly Brazilian

patient after COVID-19. All data was collected by records review. This study received approval from the Ethics Committee and the requirement of informed consent was waived.

2. Case Presentation

An elderly 74-year-old female patient with pre-existing hypertension, using enalapril and hydrochlorothiazide, had a confirmed diagnosis of COVID-19 by RT-qPCR in August 2020. After 4 months, she returns to the same hospital with complaints of sudden dyspnea and tonic-clonic convulsions. The entrance exam drew attention to somnolence and hemiplegia on the left, without other commemoratives. Computerised tomography of skull was requested, whose report showed ovate right temporobasal formations, right temporal fronto and left occipital with perilesional hypodensity, with slight mass effect. As the possibility of neoplastic injury could not be excluded, magnetic nuclear resonance was indicated for better evaluation. It was described in the report cystic lesions with peripheral relation by venous contrast in the right frontal (4.9 × 3.4 cm), right frontobasal (1.2 × 1.2 cm), right occipital (0.8 × 0.6 cm) and right temporo-occipital (2.0 × 1.9 cm) regions. As shown in Figure 1.

For diagnostic elucidation, the patient was approached by neurosurgery for histopathological analysis and culture of the lesion material. In the report, the histological sections showed cerebral parenchyma exhibiting foci of liquefative necrosis with abundant neutrophils associated with lymphocytes, some plasmocytes and macrophages. The cerebral parenchia exhibited intense reactional astrolgiosis, represented by bulky hypertrophic astrocytes (pseudoneoplastic aspect), sometimes multinucleated prominent and dilated blood vessels. Immunohistochemistry findings corroborated the inflammatory character of the lesion. Cultural assay of the surgical material was negative.

Faced with the diagnosis of brain abscess, the patient was treated for 6 weeks in a hospital regimen with intravenous ceftriaxone 2 G every 12 h, associated with vancomycin 1 g every 12 h and intravenous metronidazole 500 mg every 8 hours, and subsequently completed the regimen with another 2 weeks in a home care regimen with good clinical and radiological response.

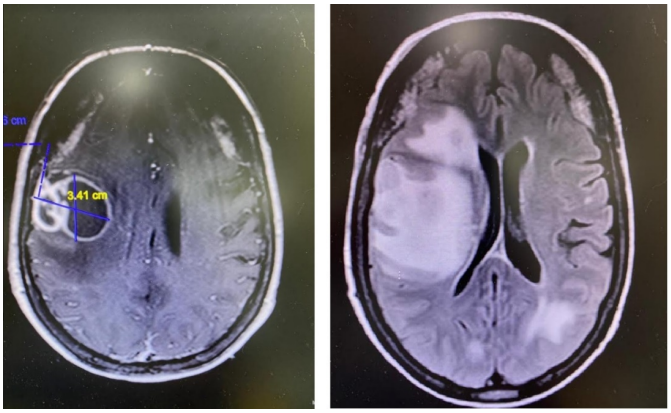

Figure 1. Magnetic resonance imaging.

3. Conclusions

In this report, we described a rare case of brain abscess after COVID-19. Brain abscess is a focal pyogenic infection of the brain's parenchyma. Intracranial abscesses are uncommon, serious, life-threatening infection. The most frequent intracranial locations are: frontal-temporal, frontal-parietal, partial, cerebellar, and occipital lobes [4]. The manifestations of brain abscess initially tend to be non-specific. The classic triad of brain abscess includes headache, fever, and focal neurological deficits, which are found in 48% of patients. Patients may however also present with only progressive changes in behaviour or cognitive defects, without focal neurological deficits or fever [5].

Although it is known that most cases of brain abscess are caused by penetrating trauma, neurosurgery or paranal sinus infections, the possible explanation for this presentation of the reported clinical case is that bacterial and fungal coinfection are common in SARS-CoV-2 pneumonia, especially in critical ill patients. The bacterial coinfection rate is 7.7%, and the fungal coinfection rate is 3.2%. Viral infection can create conditions for invasion in predisposed individuals due to the presence of a bacterium in a certain place. Thus, the combination of direct viral neuronal injury and post-infectious inflammatory or immune-mediated disorders explain the neurological consequence. Although a direct causation cannot be established in this case, immune modulation by COVID-19 infection, coexisting comorbidities and steroid use are considered to be responsible for spread of infection to the brain. Therefore, Brain abscess should be done in patients with COVID-19 as well as in recovered patients presenting with neurological symptoms [6].

Successful management of a brain abscess usually requires a combination of antibiotics and surgical drainage for both diagnostic and therapeutic purposes. As well as in the conduct of the clinical case, the neurosurgeon needs to be contacted at the time of initial diagnosis of a brain abscess [4].

Although this report has a limitation of has not identified the microorganism in the abscess culture, it's relevant to the medical literature because it describes an extremely rare complication of SARS-CoV-2 infection and the success and proper management were only possible with multidisciplinary team integration.

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Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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