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COVID-19 Presenting with Neurological Symptoms

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Introduction

Healthcare officials of Wuhan City in China became aware of several pneumonia cases with an unknown etiology in December 2019.¹ A novel coronavirus, SARS-CoV-2, was identified as cause of the disease named Coronavirus disease-19 (COVID-19).² SARS-CoV-2 enters cells through a receptor found on pneumocytes,³ and there is also evidence this receptor is located on neurons and glial cells.⁴ Recently, the neurological manifestations of COVID-19 have been described.^{5,6} However, to our knowledge, there are currently no known cases of COVID-19 presenting as cerebellar dysfunction and essential tremor, which we describe here.

Case

A 77-year-old obese man with a past medical history of hypertension and essential tremor presented with decreased mentation, episodes of blank staring, bradykinesia, and worsening bilateral hand tremors. He also reported shortness of breath with a cough productive of clear sputum. Physical exam was within normal limits except for tachypnea and hypoxia requiring 4 liters of oxygen, a bilateral essential tremor and dysmetria. All labs were within normal limits. A chest x-ray (CXR) on admission was normal, but a subsequent CXR suggested multifocal pneumonia (Figure 1). A Computed Tomography (CT) scan demonstrated scattered ground glass opacities and multi-lobar pneumonia (Figure 2), while a CT scan of the head was negative (Figure 3). Treatment was initiated for community acquired pneumonia with azithromycin and ceftriaxone.

Upon admission, the patient continued to be orientated only to person and place. Subsequent laboratory investigation demonstrated elevated ferritin (1,200 ng/mL), lactate dehydrogenase (613 IU/L), C-Reactive Protein (13.2 mg/dL), and low procalcitonin (<0.10 ng/mL). Three days after admission, the COVID-19 test resulted as positive. The patient was started on hydroxychloroquine 400mg BID for two doses, followed by 400mg QD for four days. Azithromycin 500mg was continued for a total of five days. At this time, the patient continued to have a productive cough, but his shortness of breath resolved. His mentation and neurological symptoms slowly improved following the initiation of the COVID-19 treatment regimen.

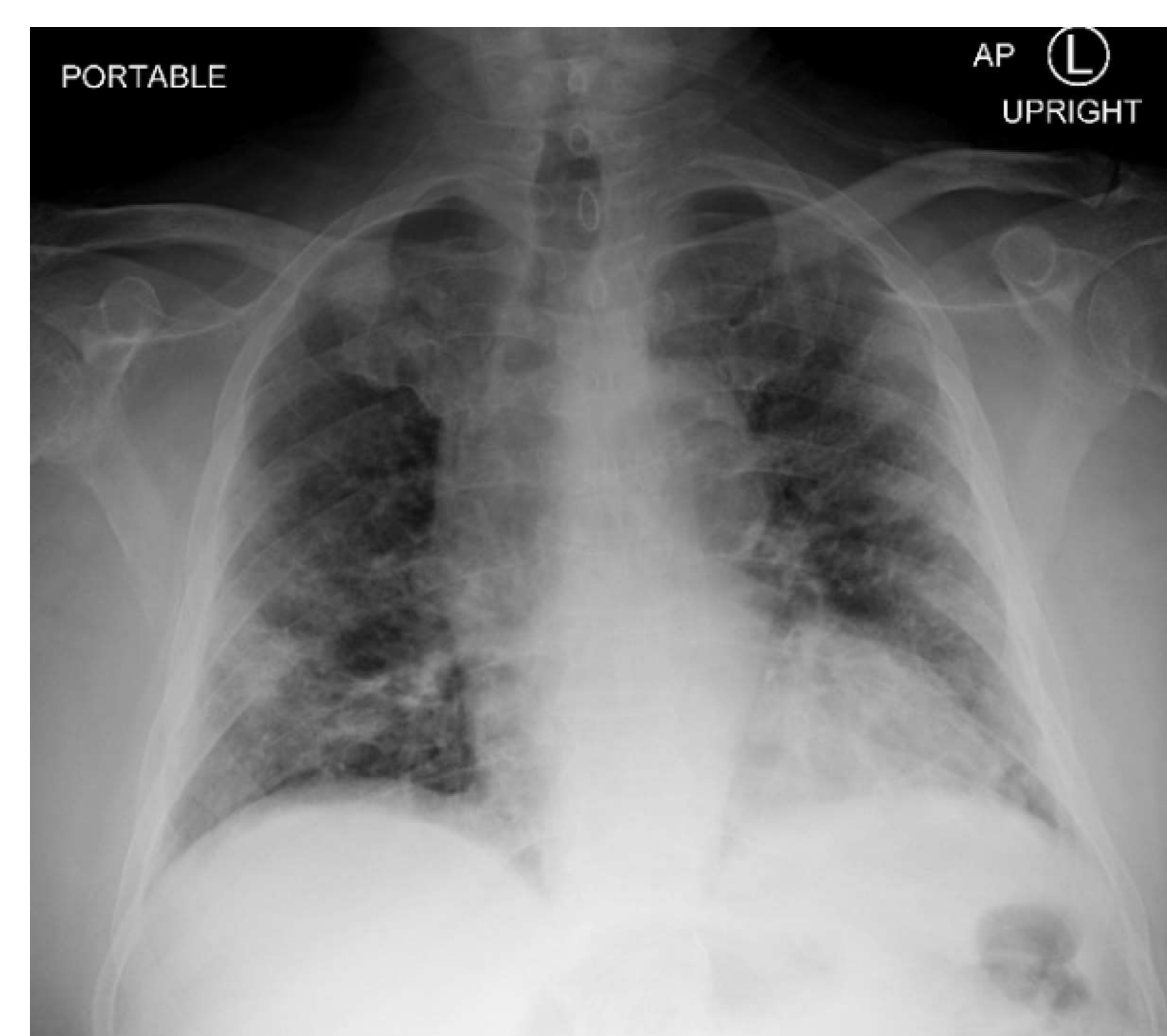


Figure 1: AP Chest X-Ray demonstrating ill-defined densities in the lower lung suggestive multifocal pneumonia characteristic of COVID-19

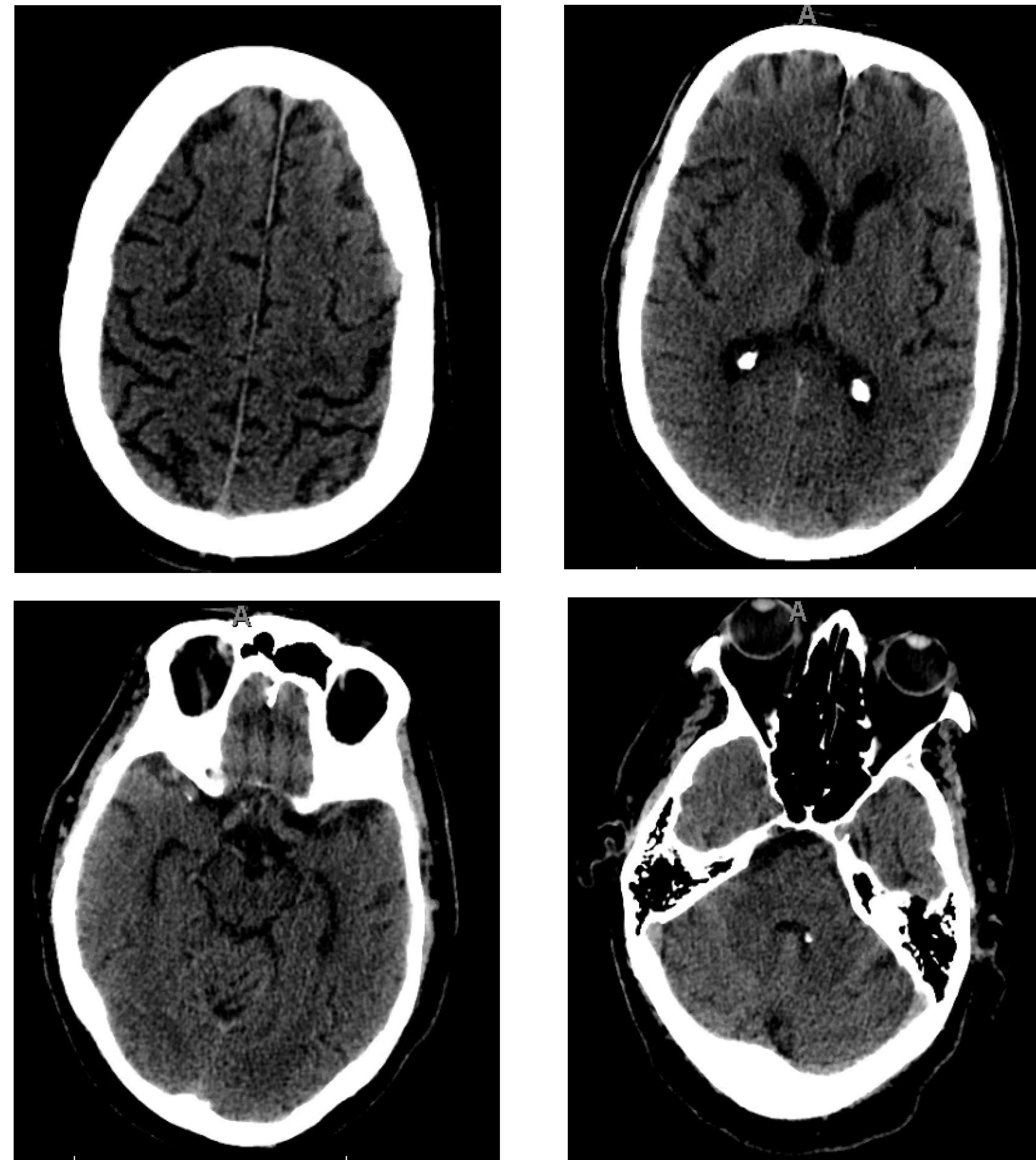


Figure 3: CT Scan of the head demonstrating no definite acute intracranial process

Discussion

The respiratory systems – cough, sputum production, and dyspnea – and imaging findings of COVID-19 are well described.⁷⁻¹¹ The presented case is unique because, while the patient did display the established symptoms of COVID-19, he also had encephalopathy, bilateral essential tremor, and cerebellar dysfunction. Neurological imaging was negative, and patients with these symptoms would traditionally receive further investigation. Patients with neurological dysfunction secondary to COVID-19 can demonstrate some significant findings on magnetic resonance imaging (MRI) such as enhancement in the leptomeningeal region and bilateral frontotemporal hypoperfusion on perfusion imaging.⁵

However, because of his concomitant respiratory symptoms, and in context of the ongoing COVID-19 pandemic, our patient did not receive further neurological imaging as there was a high index of suspicion. The central and peripheral nervous system manifestations of COVID-19 are documented,^{5,6} but this case demonstrates that COVID-19 can result in cerebellar dysfunction as well.

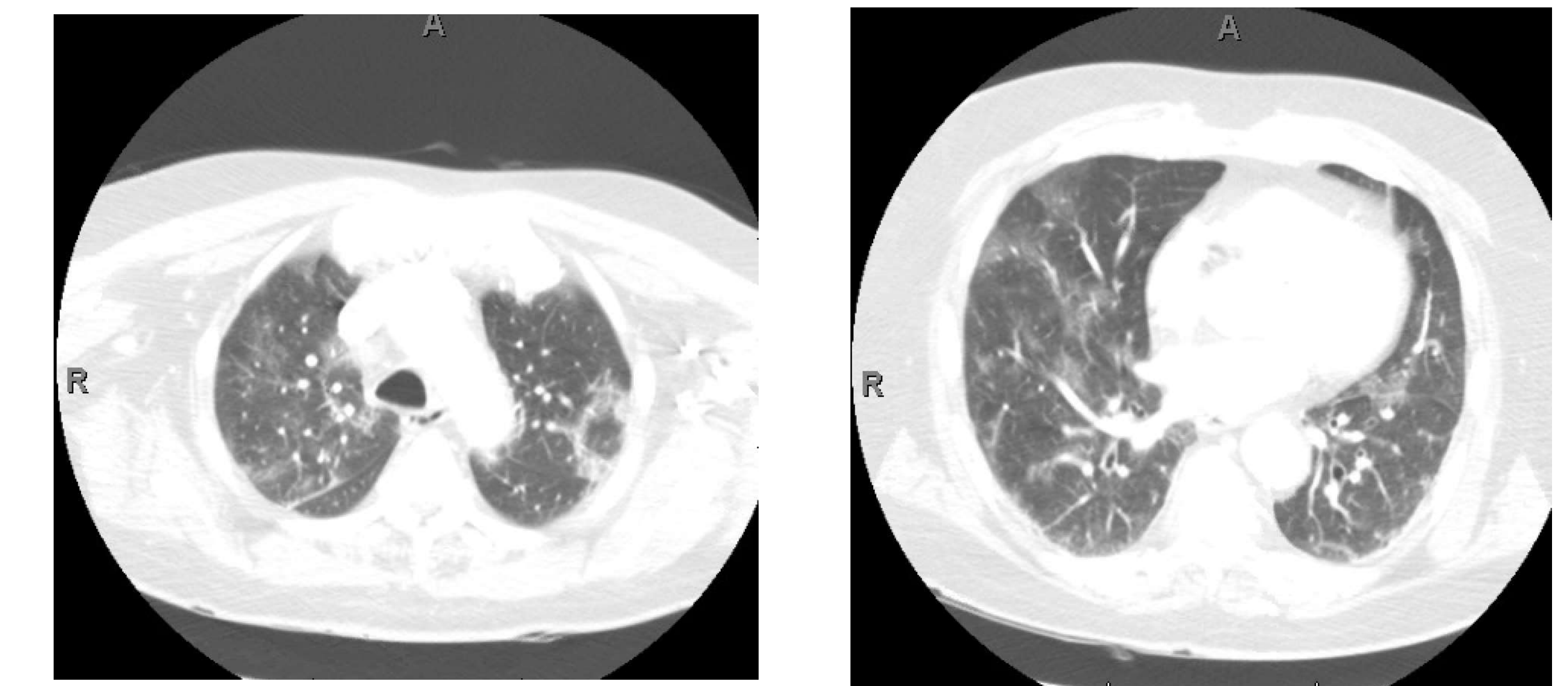


Figure 2: CT Scan of the a) apices and b) basilar lungs demonstrating scattered ground glass opacities characteristic of COVID-19

Conclusion

COVID-19 is caused by SARS-CoV-2, a virus that enters host cells via a receptor primarily found on pneumocytes but also neurons and glial cells. As such, the most common presenting symptoms are respiratory. Here we present a case of a patient presenting with neurological dysfunction in addition to the established respiratory symptoms.

Learning Points

- Our patient presented with encephalopathy, worsened essential tremor, and cerebellar dysfunction, which is an unusual presentation of COVID-19.
- In an ongoing pandemic, it is important to have a high index of suspicion, even when patients present with atypical symptoms.
- It is unclear at this time if hydroxychloroquine and azithromycin should be the treatment of choice for COVID-19,^{12,13} but the patient improved while undergoing this treatment regimen.

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