Acta Scientific Neurology (ISSN: 2582-1121)

Volume 5 Issue 6 June 2022

Case Report

MRI Findings of Anosmia Due to Long Covid Syndrome

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Received: January 10, 2022

Published: May 25, 2022

Abstract

Corona virus disease (COVİD -19) can cause neurological symptoms and complications. These findings can be seen in central nervous system, musculoskeletal and peripheral systems. Many sources use MRI (magnetic resonance imaging) as the imaging technique to diagnose anosmia due to COVİD-19, and to analyze the involvement of the olfactory nerve and the olfactory bulb.

A 25- year- old female patient presented to our clinic, with complains of prolonged anosmia for nine months. Radiological imaging was done, showing the right hemisphere olfactory area lesion, clinical follow up findings was discussed.

Keywords: COVİD-19; Anosmia; MRI; SARS-CoV-2

Introduction

Corona virus disease (COVİD -19) can cause neurological symptoms and complications. These findings can be seen in central nervous system, musculoskeletal and peripheral systems. Many sources use MRI (magnetic resonance imaging) as the imaging technique to diagnose anosmia due to COVİD-19, and to analyze the involvement of the olfactory nerve and the olfactory bulb.

The entry pathways of SARS-CoV-2 to the brain and the CNS are studied by the scientists. In this case, it was seen that the olfactory cortex was affected by the virus unilaterally which has not been reported before.

Case Report

A 25-year-old female patient was admitted to the hospital in February due to cough, fever and inability to smell complains. With suspicion of Covid disease, blood tests as well as radiologic tests were performed. Covid -19 PCR was evaluated positive. When the patient's chest X-ray and also O2 saturation were found to be normal, drug treatment (Favipiravir, Azithromycin) was started as an outpatient follow-up, and she was sent home. While the PCR positivity continued one week later, the general condition of the patient was found to be improving, but the patient's anosmia complaint did not resolve. In the third week, the PCR was evaluated negative, but the complaint of not being able to smell did not go away. After 3 months, she admitted to the otorhinolaryngology clinic.

Examinations were performed and the results came in normal. Then she was treated with corticosteroids and other medications that have shown effect in post-infectious olfactory dysfunction (OD) including intranasal sodium citrate, which is thought to modulate olfactory receptor transduction cascades, intranasal vitamin

A, which may act to promote olfactory neurogenesis, and systemic omega 3, which may act through neurodegenerative or anti-inflammatory means.

Olfactory training involves repeated and deliberate sniffing of a set of odorants (commonly lemon, rose, cloves, and eucalyptus) for 20 seconds each at least twice a day for at least 3 months (or longer if possible). Studies have demonstrated improved olfaction in patients with post-infectious OD after olfactory training [8]. Olfactory training can be considered for patients with persistent COVID-19 -related OD because this therapy has low cost and negligible adverse effects.

However, she did not benefit from the treatment and just partially improved.

Later on, besides anosmia, she started having complains about a bad odor when smelling different foods. During this period the patient, applied to the neurological outpatient clinic. There were no lateralized and pathological findings except olfactory nerve finding (anosmia) in the examination. There was no disturbance in the sense of taste. There was no abnormality in the pyramidal and extrapyramidal system examination. The radiological images (MRI in this case) showed a hyper-intense lesion in T2 and a hypointense signal in T1 in the right hemisphere olfactory area. Also no contrast enhancement was seen. No epileptic activity was found in the requested EEG and it was evaluated as normal. No abnormal findings were found in the routine blood tests of the patient during this perio

Discussion and Conclusion

Coronavirus disease (COVID -19) can cause neurological symptoms and complications in the form of executive dysfunction (dysexecutive syndrome) manifested by severe headache, ischemic, thrombotic and hemorrhagic infarction, epileptic seizures, toxic infectious encephalopathy, acute encephalitis, delirium, meningitis, frontal lobe damage, paresis and peripheral nervous system involvement. Also anosmia, dysgeusia or ageusia, acute myelitis, Guillian Barre Syndrome, miller fisher's syndrome and polyneuritis cranialis have been reported.

In addition, the complaints and symptoms of the disease after treatment are known as prolonged Covid syndromes after if they last more than 3 months. Many articles and researches have been made about the prolonged period. The exhibit prolonged multiorgan findings after the acute infection period has passed. These findings are chronic cough, shortness of breath, joint pain, memory decline, chest pain, sleep disturbance, palpitation, dizziness, numbness and tingling, ageusia, anosmia, sleep disturbance, depression and extreme weakness.

The olfactory system is the most thoroughly studied component of the chemosensory triad and processes information of a wide concentration and quality range of chemical stimuli. the axons arising from the receptor cells project directly to neurons in the olfactory bulb which projects in turn to the pyriform cortex in temporal lobe. These also projects to hypothalamus and amygdala. The thalamus provides olfactory information to several additional regions of cerebral cortex.

Pathways of SARS-CoV-2 entry into the brain are studied by researcher. In previously reported physiopathological explanations [1] Cytokine storm, massive influx of cytokines possibly disrupts the blood brain barrier (BBB), leading to structural and functional problems [2]. endothelial dysfunction leads to BBB damage. Cerebral microangiopathies leading to cerebral thrombosis and endothelitis resulting in brain edema and hypoxia [3], cause diffuse small vessel thrombosis.

There are reports that the MRI signals are concentrated in the fronto-basal lobe and decrease wıth covid-19 recovery [7]. However, it has been observed that it doesn't have a temporary cortical effect.

In this case, by looking at the unilateral lesion on the MRI the differential diagnosis, a diseases similar to edema observed in status epilepticus or demyelinating disease and ischemic changes can be explained by Covid disease.

On fluid-attenuated inversion recovery (FLAIR) images and T2 hyper-intensity there is no evidence of the bilateral olfactory bulb involvement. Our and others' observations of normal brain imaging in subjects with COVID-19-related olfactory dysfunctions suggest that these imaging changes might not always be present in COVID-19, or are limited to the very early phase of the infection. Furthermore, anosmia can be a predominant COVID-19 manifestation, and this should be taken into account when identifying and isolating infected patients in order to avoid disease spread.

In this case, which has not been reported before, the olfactory cortex was affected unilaterally causing anosmia due to long Covid's disease.

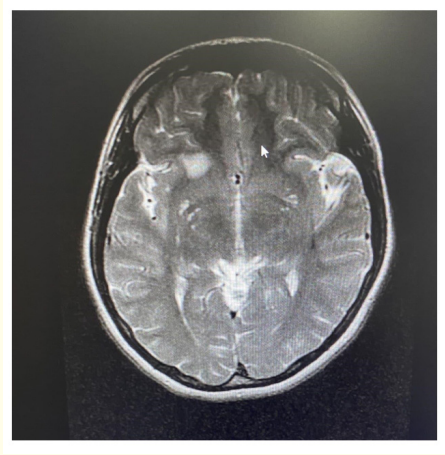
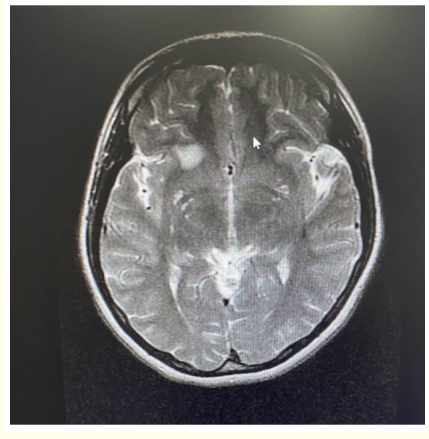


Figure 1



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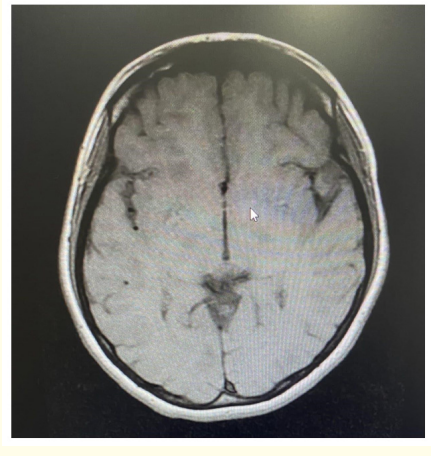

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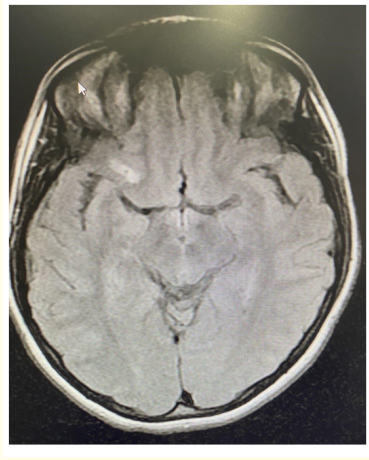

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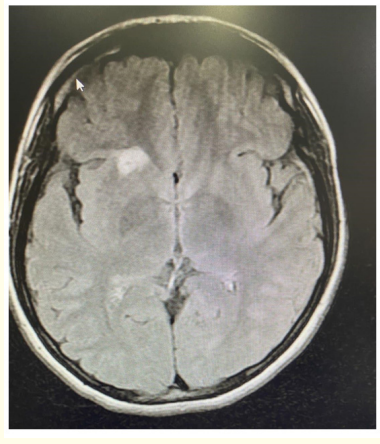

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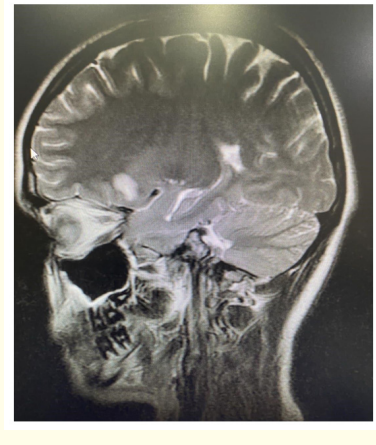

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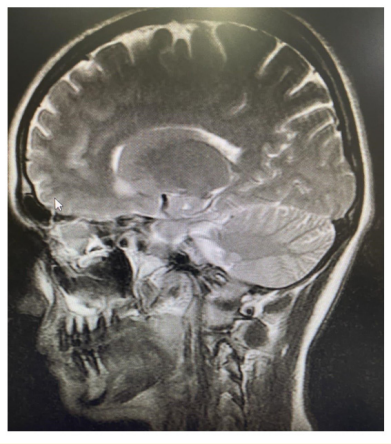

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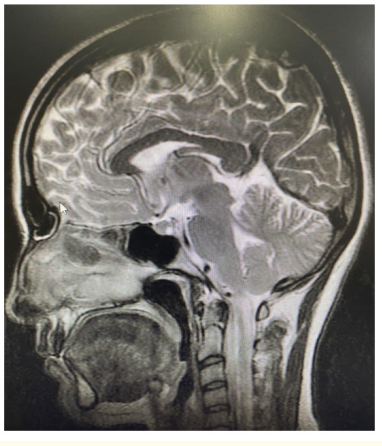

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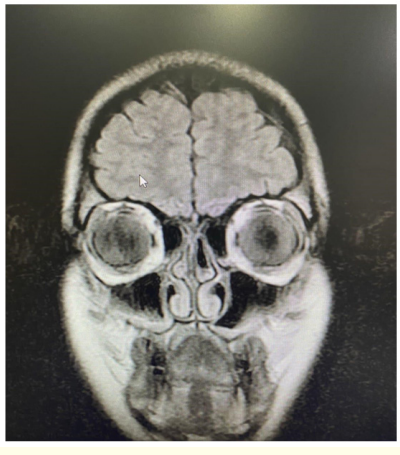

Figure 9

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