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Case Report

A case of trigeminal neuralgia after COVID-19

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Abstract

Background: The COVID-19 pandemic in the United States is a part of the worldwide pandemic of coronavirus disease 2019 (COVID-19) caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). Symptoms can vary in COVID-19 among which central nervous system (CNS) involvement can be included. As this disease is studied locally, nationally and globally, attention to neurological manifestations presentations should be documented for better understanding.

Methods: A clinical case of trigeminal neuralgia will be discussed along with presentation of signs, symptoms, differential diagnosis and the potential association of it with COVID-19.

Results: A 41-year-old woman presented to the clinic for a routine eye examination which was prompted by chronic facial pain on one side described as constantly dull up to excruciatingly painful when brushing her teeth. No other neurological pain was reported. The patient was diagnosed with Sar-CoV-2 and subsequently trigeminal neuralgia two weeks after testing negative COVID-19.

Conclusion: Trigeminal neuralgia may be triggered after testing positive for COVID-19, yet further investigations are needed.

Keywords: Trigeminal neuralgia, Covid-19, SARS-CoV-2

Introduction

The trigeminal nerve is one of twelve pairs of cranial nerves that attach to the brain. The name "trigeminal" literally means three twins and refers to the fact that the fifth cranial nerve has three major divisions: the ophthalmic (V_1), the maxillary (V_2), and the mandibular (V_3) [1]. The trigeminal nerve is the major sensory nerve of the face and is the nerve of the first branchial arch. Emerging from the mid-lateral surface of the pons as a large sensory root and smaller motor root, the trigeminal ganglion sits in the depression of the trigeminal cave in the floor of the middle cranial fossa. The ophthalmic and maxillary nerve course through the cavernous sinus before leaving the cranial cavity. The motor root travels with the mandibular division [1].

The ophthalmic upper branch supplies sensation to the scalp, forehead, and front of the head. The maxillary middle branch stimulates the cheek, upper jaw, top lip, teeth and gums, and to the side of the nose. The mandibular lower branch supplies nerves to the lower jaw, teeth, gums, and bottom lip [2]. All branches can be affected by trigeminal neuralgia (TN). Both sides of the face are rarely affected simultaneously yet may be affected at different times [3].

Case Report

A 41-year-old woman presented to the clinic for a routine eye examination which was prompted by chronic facial pain on one side described as constantly dull up to excruciatingly painful when brushing her teeth. No other neurological pain was reported. Uncorrected visual acuities were 20/20 OD, OS and OU at distance. Uncorrected, near acuities were 20/20 OD, OS and OU. The patient uses computer glasses for prolonged periods of computer use with decrease eyestrain with a prescription reported as +0.50 sphere OD, and +0.50 OS. No other ocular complaints were noted except headache associated reading which started at the same time of onset of facial pain.

Medical history was unremarkable except for a three-week prior exposure, contraction and positive RT-PCR test for SARS-CoV-2. Her D-dimer levels tested through blood work at the time of

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Figure 1. Patient with neurological pain across three distinct areas (purple, green and blue) as depicted in the photo. (colors on face adapted from getty images).

initial diagnosis of SARS-CoV-2 was slightly elevated at 600 ng/ml (upper limit: 500 ng/ml). The patient experienced fever, sore-throat, fatigue, muscle aches, and severe nasal congestion for a period of two weeks. Immediately after the COVID-19 episode and testing negative on RT-PCR, new symptoms of facial pain and headache developed. On the day of the examination, her RT-PCR results were reported as negative five days prior, and her rapid home test was negative the day before.

Based on the patients' signs, symptoms, description of pain, duration of pain and clinical examination, the patient was diagnosed with trigeminal neuralgia. The patient was referred to neurology for magnetic resonance imaging (MRI) to rule out compression to the trigeminal nerve. MRI testing was unremarkable. Treatment of carbamazepine was unsuccessful due to unacceptable side effects. After three weeks, all signs of TN subsided yet returned for one week in week six at a lower intensity for three days.

Discussion

When facial pain is the presenting symptom, trigeminal neuralgia should remain high on the list of differential diagnoses despite it being a relatively rare condition. Based on individual underlying causes, TN can be classified using three classes which include idiopathic, classic, or secondary [3]. Idiopathic TN has no known cause. Classic TN has a neurovascular compression component in the root entry zone of the trigeminal ganglion. This compression causes demyelination and upregulation of voltage-gated sodium channels [4]. Secondary TN is associated with multiple sclerosis, tumors or arteriovenous malformations [4].

For this case, there may be a direct mechanism of action between COVID-19 and TN [5]. The COVID-19 virus may invade and disseminate to the central nervous system in a retrograde manner through biding of SARS-Cov2 to the surface receptors of the angiotensin converting enzyme type 2 that are present in the trigeminal ganglion terminals of the nasal cavity causing headache and facial pain [5]. In addition, the cytokine storm generated by COVID-19 may additionally trigger activation of the trigeminal-vascular system [6]. Both mechanisms of action cause headache and facial pain, yet more studies are needed to definitively address the association between COVID-19 and TN.

Conclusion

Trigeminal neuralgia has many causes, with idiopathic comprising most cases. The exact connection between TN and COVID-19 while highly speculated exists, more studies need to be done to understand the exact correlations. This case is unique in that there have not been many to describe TN immediately following COVID-19. Further investigations are needed.

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