An atypical COVID-19 presentation with vestibular neuritis, hemi-facial spasms and Raynaud's phenomenon

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Abstract

COVID-19 pandemic has created a global health crisis. Though respiratory symptoms have been the usual manifestations, the presentation in some cases may be atypical with various neurological and cutaneous manifestations. We present a case of a 63-year-old female diagnosed with COVID-19 and associated rare manifestations during her visit to Europe.

Introduction:

The outbreak of COVID-19 was caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), first identified in Wuhan, a city in Hubei province in China in December 2019. As of September 21, 2020, nearly 31.1 million cases and 962,000 deaths were reported in 213 countries and territories. Severe acute respiratory syndrome CoV (SARS-CoV) and novel CoV were believed to share the same receptor, angiotensin-converting enzyme (ACE), hence the virus is termed as SARS-CoV-2, and World Health Organization named the disease as coronavirus disease 2019 (COVID-19) in February 2020 and declared as pandemic on March 11, 2020.

Initially, fever, cough, shortness of breath, and myalgia were reported as common symptoms and pneumonia-like features in chest computerized tomography (CT) scan in patients affected by COVID-19.[1] But, later, various neurological manifestations were noticed. Olfactory and gustatory involvement resulting in anosmia and dysgeusia are common neurological symptoms in mild cases. Guillain-Barre syndrome and inflammation of the brain, spinal cord, meninges, cranial nerve, and peripheral nerve involvement are reported.[2] Various cutaneous manifestations like a morbilliform rash, urticaria, vesicular eruptions, acral lesions, petechiae, chilblains, Livedo racemosa, and distal necrosis are also seen.[3]

We report a 63-year-old Caucasian female journey who had a diagnosis of COVID-19 with other associated manifestations during her visit to a small country in Europe.

Case:

A 63-year-old Caucasian female with a past medical history of aplastic anemia, mitral valve prolapse with regurgitation, celiac disease, and motion sickness presented with a runny nose and breathlessness. She did not report fever, chills, cough, or chest pain. Given the past history of aplastic anemia, she took over the counter iron pills for shortness of breath with no improvement. She is a resident of the United States but an avid traveler and was in Europe when the symptoms developed. The symptoms developed in March 2020 when there were no reported COVID-19 cases.

When there were no signs of improvement after a few days of symptomatic management, the PCR for the SARS-CoV-2 test was performed, which came back positive, confirming the diagnosis of COVID-19, and she was advised home quarantine.

About four weeks after the initial episode, the patient developed twitching of the left eye and left cheek, diarrhea, generalized weakness, palpitations, sleep disturbances, decreased appetite, skin rash, anosmia, and dysgeusia. Twitching was involuntary, initially started near the left eye, and progressed to the left side of the face. The patient described it as a strong one that disturbed her daily activities. It was not associated with pain, loss of sensations, or numbness. There were 8-10 painful, red skin lesions around 3mm in size in the lower face, especially around the mouth. These lesions are herpes labialis caused by herpes simplex type-1 (HSV-1). There was no associated itching, bleeding, blistering, or discharge. She also noticed the purple discoloration at the base and whitish discoloration at the fingers' tips with temperature changes, as shown in the picture (Figure 1). As she is a visitor with a traveler's health insurance, she could not receive investigations or treatment. She took plenty of fluids, symptomatic treatment, and over-the-counter baby aspirin, multivitamins, and calcium supplements. Over the next four weeks, she began to improve. The patient was tested for COVID-19 every week until she was negative on the 58th day.

One week after she tested negative for COVID-19, she suddenly had chills, vomiting and woke up in the middle of the night with dizziness, the room spinning with an unsteady gait. She denied tinnitus or hearing loss. Physical examination showed a strong phase of nystagmus to the right, indicating left ear involvement. Dix-Hallpike maneuver was performed, and she was confirmed with vertigo and diagnosed post-viral vestibular neuritis. Initially, she was managed with meclizine, antiemetics, and Cawthorne vestibular rehabilitation exercises. When symptoms got worse, the patient was given 60mg of methylprednisolone tapered gradually for ten days. On the 10th day of steroids, the patient noticed a sudden onset of flashes and floaters, vertically and temporally located in the left eye. A slit-lamp examination diagnosed posterior vitreous detachment (PVD) of the left eye. PVD was attributed to an increase in intraocular pressure with steroid use. There is a slight improvement in vision after cessation of steroids.

Several weeks later, the patient developed high-grade fever, arthralgias, arthritis, and a non-itchy urticarial rash all over her chest and abdomen eight hours following the intake of 2g Augmentin for a dental procedure. Fever was as high as 102F, not associated with chills and rigors. The patient did not develop lymphadenopathy or pedal edema. Symptoms subsided in a couple of days without any treatment. Five months after positive COVID-19 test, she is negative for IgG antibodies.

Discussion:

We are learning to understand the COVID-19 disease, an emerging infection that resulted in a global pandemic. Initially, respiratory symptoms are most distinctively seen in COVID-19 patients. It is believed that pro-inflammatory cytokine release, known as 'cytokine storm,' causes pulmonary damage, and it is the likely mechanism of CNS damage. ACE2 is the functional receptor for the SARS-CoV-2 virus, present in multiple organs such as the lungs, heart, nervous system, skeletal muscles, blood vessels, kidney, liver, and gastrointestinal tract. The ACE2 receptor is found remarkably in the epithelial lining of lung alveoli, enterocytes of the small intestine, the endothelial lining of arteries and veins, and arterial smooth muscles of all organs.[4] Hence, COVID-19 can affect any of the organs, as mentioned above. SARS-CoV-2 enters the CNS through either a hematogenous or retrograde neuronal route; the neural invasion mechanism is mainly through the cribriform plate, olfactory nerve, thalamus brainstem. Thus, resulting in the suppression of central cardiorespiratory drive.[5] Mao et al., in a study in Wuhan published in April 2020, mentioned that the neurological manifestations are seen in critically ill patients.[6]Later, it is noticed that many patients with few or no symptoms of COVID-19 disease also had neurological symptoms.[7]Further, Mao et al. classified neurological manifestations as dizziness, headache, impaired consciousness, ataxia, seizure, and acute cerebrovascular disease into central nervous system manifestations. Nerve pain, taste, smell, and vision impairment into peripheral nervous system manifestations and skeletal muscular injury manifestations.[6]

Our patient presented with features of peripheral nerve involvement (anosmia and dysgeusia), cranial nerve involvement (hemifacial spasms and vestibular neuritis), and Raynaud's phenomenon. Peri- and post-infectious anosmia and dysgeusia could be secondary to olfactory nerve lesion or apparatus damage from viral infection. The majority of patients presented at the same time or a few days after the onset of other COVID-19 symptoms.[8] Hemifacial spasm is a neuromuscular movement disorder with slight intermittent

contractions or twitching of the muscles innervated by the facial nerve (cranial nerve VII). Though twitching is irregular initially, it may be severe, more persistent, and can spread to the muscles of facial expression in the following months. Sometimes, a mild peripheral weakness can develop. The spasms are due to compression of the facial nerve by the artery at the root exit of the brainstem. The clinical features are essential in diagnosing the disease; electromyography and magnetic resonance imaging (MRI) are additional diagnostic modalities to determine the underlying cause.[9] A case report by Hutchins et al. described the association of bilateral facial paralysis with paresthesia, a subtype of Guillain- Barre syndrome, and COVID-19.[10] Few studies describe facial nerve involvement, causing Bell's palsy but relatively do not know much about the hemifacial spasms in COVID-19.

Acute vestibular neuritis (VN), or peripheral vestibulopathy (PVP), is defined as a lesion of the eighth cranial nerve's vestibular component without auditory deficits. It is a clinical entity with the features of vertigo or dizziness along with nausea or vomiting, gait instability, head motion intolerance, and nystagmus, which is developed over minutes or hours. The most common cause is the reactivation of latent herpes simplex virus, especially herpes simplex virus type 1 (HSV-1).[11] But a case report by Malayala et al. mentioned that COVID-19 infection could cause vestibular neuritis in susceptible populations.[12] The possible source of vestibular neuritis in our patient is post-viral inflammation of the vestibular nerve, probably due to HSV-1 or COVID-19 infection. Considering the pandemic, the cause of VN is perhaps due to COVID-19 infection, given that VN's features were seen after a week of negative COVID-19 test. As pathophysiology is uncertain in most cases, symptomatic treatment with antiemetics, antihistamines, anticholinergic agents, antidopaminergic agents, and benzodiazepines are given.[13] Sometimes, methylprednisolone shows significant improvement of peripheral vestibular function recovery in severe cases. [14] Resumption of regular activity and vestibular rehabilitation with Cawthorne and Cooksey exercises promotes central vestibular compensation.[15]

COVID-19 has also been associated with various cutaneous manifestations like a morbilliform rash, urticaria, vesicular eruptions, acral lesions, petechiae, chilblains, Livedo racemosa, and distal necrosis.[3,16] The possible mechanisms for cutaneous manifestations are the lymphocytic vasculitis induced by blood immune complexes activated by cytokines due to viral particles in the cutaneous blood vessels in patients with COVID-19.[17] A few case reports noted that cutaneous findings are present before developing respiratory symptoms. In contrast, a few case reports found that these findings are seen several days after the onset of symptoms.[16] Our patient presented with Raynaud's phenomenon (RP) during the disease and urticarial rash several weeks later despite no previous history. Kolivras et al. described the first case of COVID-19 induced chilblains due to the delayed expression of the IFN-inducible genes, further exacerbating hypercytokinemia.[18] Chilblains and RP are related to circulation but do not necessarily mean to have both. Chilblains are an inflammatory skin reaction to an abnormal vascular response to cold. They present as tender, pruritic, red lesions on the dorsal aspect of fingers or toes. [19] In contrast, RP is the triphasic color change with initial pallor, followed by cyanosis and erythema due to abnormal vasoconstriction of the digital arterioles when exposed to cold. RP's diagnosis is mainly made with history, and physical examination mainly affects hands, and the thumb is often spared. RP is primarily associated with systemic lupus erythematosus and CREST (Calcinosis, Raynaud phenomenon, Esophageal dysmotility, Sclerodactyly, and Telangiectasia) syndrome. Hence, the autoantibodies and nail fold capillary microscopy together give a clue to the diagnosis. Most of the patients with RP will respond well with general measures like smoking cessation, avoidance of cold exposure, repeated trauma, and vasoconstricting drugs. Few patients who do not respond to general measures will require pharmacological treatment that includes a calcium channel blocker, losartan, an angiotensin II receptor blocker.[20]

Our case report mentioned the neurological and cutaneous manifestations in a patient with COVID-19 with an excellent prognosis. To our knowledge, this is the first case report of COVID-19 induced hemifacial spasms and Raynaud's phenomenon. Until further validation by other studies, we would like to alert the clinicians to various disease presentations in COVID-19, who are immediately tested and treated. Respiratory symptoms remain the hallmark of early identification and management of COVID-19; the treatment should not be delayed while keeping in mind the other manifestations.

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Figure legend: Raynaud's phenomenon during the acute COVID-19 infection with bluish discoloration of the extremities

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