

Isolated ophthalmoparesis in a COVID-19 patient A case report and literature review

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Abstract

We are reporting a COVID-19 positive patient who developed diplopia and was found to have an isolated abducens palsy. We reviewed the available English literature of cranial mononeuropathy as a possible manifestation of COVID-19 infection. It is a rare presentation of COVID-19.

Isolated ophthalmoparesis in a COVID-19 patient

A Case Report and Literature Review

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Short Title: COVID and Abducens palsy

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Abstract

COVID-19 has caused a global pandemic, while it is primarily a respiratory pathogen, reports are emerging of neurological manifestation. We are reporting a COVID-19 positive patient who developed diplopia and was found to have an isolated abducens palsy. We reviewed the available English literature of cranial

mononeuropathy as a possible manifestation of COVID-19 infection. We found that it is a rare presentation of COVID-19. We suggest that an isolated abducens palsy in association with respiratory symptoms should raise the suspicion of COVID-19 infection, particularly in the current pandemic.

Keywords: COVID-19, Diplopia, Abducens palsy, Neurological manifestations

Abbreviations:

CTV (Computed Tomography with Venography); MRI (Magnetic Resonance Imaging); CSF (Cerebrospinal Fluid) ; PCR (Polymerase Chain Reaction), CVT (Cerebral Venous Thrombosis) ; MERS- CoV (Middle Eastern Respiratory Syndrome Coronavirus) ; SARS- CoV (Severe Acute Respiratory Syndrome Coronavirus)

Introduction:

Since the outbreak of the coronavirus in early December 2019, in Wuhan, China, the virus has rapidly spread throughout the world, gaining a “Pandemic” status. Since then, studies, case reports, and research papers started to be published^{3,1} linking the virus to a myriad clinical manifestation, involving various systems. While the primary target of the virus is the respiratory system, the neurovascular invasiveness of the virus is demonstrated in humans and animals^{2,3}. However, some neurological manifestations in COVID-19 patients are reported but still not well-understood.

Studies have shown that the most common neurological manifestations were nonspecific such as headache, dizziness, and agitation^{4,5}. Other manifestations include stroke, seizures, and encephalopathy^{4,6}. Cranial nerve involvement in COVID-19 patient apart from anosmia and ageusia is rare^{8,7}.

We present here a case of isolated ophthalmoparesis in a patient with a mild COVID-19 pneumonia and a comprehensive literature review of similar cases published in English from December 2019 to end of March 2021.

Case presentation:

A 48-year-old male, previously healthy, was admitted with vomiting, cough and diarrhea, his chest X-ray showed bilateral lower zone infiltrates (figure A), nasopharyngeal swab was positive for COVID-19.

He also complained of binocular diplopia more pronounced on looking to the left that started a day after his initial manifestation, he had no loss of smell or taste.

On examination, there was a clear limitation of abduction in the left eye with left gaze. Right, upper and lower gazes were intact, as well as convergence (figure B). Other cranial nerve examination was unremarkable including visual acuity, pupillary reflexes and fundoscopy.

General examination was unremarkable, and patient had vitals and oxygen saturation within normal limits without supplemental oxygen. The patient first underwent Computed Tomography with venography (CTV) and mass lesions with increased intracranial pressure and cerebral venous thrombosis was ruled out.

Magnetic Resonance Imaging (MRI) of the head with contrast was done (figure C & D), and it showed no evidence of any intracranial mass lesions, nor enhancement involving the nerve or its course. A lumbar puncture was performed and showed the cerebrospinal fluid (CSF) to have a normal opening pressure and was acellular, with negative cultures, normal protein, and glucose level. Tuberculosis acid fast bacilli, polymerase chain reaction (PCR) and culture were negative.

Autoimmune screen was also negative and an HBA1c was 5.2%. The patient was treated with hydroxychloroquine, azithromycin, and ceftriaxone as per our local protocol at that time. He also used an eye cover which helped with his diplopia. By day 10, his 6th nerve palsy has improved remarkably and was discharged to home isolation and outpatient follow up.

Literature review:

We searched PubMed and Google Scholar from 1stDecember 2019 to the end of March 2021, we found six articles with a total of 9 patients with ophthalmoparesis secondary to cranial mononeuropathy as a possible neurological manifestation of COVID-19. We excluded patients critically ill, post-intubation, and Miller Fischer patients. Females were the majority (6/9 ;66.7%). The mean age of the patients was 42 ± 14.1 years (range 2-71); most of them were previously healthy. Out of nine patients, two had third nerve palsy; and seven had sixth nerve palsy. The onset of ophthalmoparesis varied but usually manifested 3-8 days after the start of respiratory symptoms. MRI was done and was unremarkable in 4 out of 6 patients (similar to our patient), interestingly, 7 patients had mild symptoms such as, fever, shortness of breath, anosmia, ageusia, and cough, whereas 2 patients required supplemental oxygen.

Outcomes were documented in 6 patients who responded favorably to conservative treatment and had resolution of the ophthalmoparesis after 14 days to 6 weeks. The cases are summarized in table (1).

Discussion:

We are reporting, a case with unilateral, isolated abducens nerve palsy in a patient with no known prior co-morbidities, and a mild COVID-19 pneumonia.

Unilateral abducens palsy is the most common type of isolated ocular motor nerve palsies possibly due its small size and long course^{1,4}, this also hold true for post COVID-19 infection. A workup to exclude more serious causes such as increased intracranial pressure, stroke, infectious causes, and cerebral vein thrombosis, with stroke and CVT being more suspected than usual in patients with COVID-19, especially with the increasing reports about the thrombogenic potential of the virus^{1,5}. While the neurological manifestations of COVID-19 are still being explored, it seems to be more frequent in severe COVID-19 pneumonia unlike our case which was mild. Furthermore, the acellular, aseptic CSF seen in our case is similar to what Gutierrez et al.^{1,6} has reported although the difference that our patient had no ageusia or anosmia .

Neurological injury has been previously described in SARs-CoV and MERS-CoV patients^{1,7}. The mechanism of injury is postulated to be through either widespread inflammation, or direct viral invasion of the neuro-epithelium and gaining access the central nervous system through the olfactory nerve and olfactory bulb, (anosmia is present in up to 60% of the cases)^{1,8} , or piggybacking on retrograde axonal transport through other cranial nerves^{1,9}.

Conclusion:

Post COVID-19 cranial nerve involvement is rare. The 6th nerve is more commonly affected than the others and may attest to the virus neuro-invasiveness or enticement of inflammation. The acute presentation of a patient with cranial nerve involvement with or without respiratory symptoms in the current pandemic should prompt investigations for the underlying cause and testing for COVID-19.

Disclosure Statement

The authors have no conflicts of interest

Ethical statement:

Photographic consent signed by the patient and is available on request

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Table 1 OPTHALMOPARESIS.docx available at <https://authorea.com/users/377042/articles/532295-isolated-ophthalmoparesis-in-a-covid-19-patient-a-case-report-and-literature-review>



