

Neuro-ophthalmic presentation of COVID-19 disease: A case report

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COVID-19 is a respiratory virus, which has affected various organ systems as well. Here we report a neuro-ophthalmic presentation of pituitary apoplexy under the setting of COVID-19 infection in a middle-aged man who presented to ophthalmic emergency with sudden bilateral loss of vision along with a history of fever past 10 days. There was sluggishly reacting pupils and RT-PCR for COVID was positive. Imaging pointed the diagnosis as pituitary macroadenoma with apoplexy. In view of pandemic situation, patient was given symptomatic treatment as per the protocols and stabilized. Vision also showed improvement to some extent and the patient is awaiting neurosurgery

Key words: COVID-19, CVA and COVID-19, neuro-ophthalmic presentation

The pandemic of COVID-19 virus has led to multiple arrays of clinical manifestations including those affecting the cerebrovascular system. The pathogen of COVID-19 is a novel coronavirus (severe acute respiratory syndrome coronavirus-2 [SARS-CoV-2]), a member of the Coronaviridae family.^[1] Various reports have suggested ocular involvement: conjunctivitis, hyperemia, chemosis, or increased secretions. Cerebrovascular events are being increasingly reported since the pandemic has set in. To date, there are 12 case studies reporting 47 cases of cerebrovascular disease (CVD) in COVID-19.^[2] Studies have also reported that raised D-dimer levels pose an increased risk of thromboembolism, while treatment with low-molecular-weight heparin can cause an increase in bleeding tendencies. Here we would like to present a case of pituitary apoplexy as a cerebrovascular event under the setting of COVID-19 infection who ended up in ophthalmic emergency.

Case Report

A 46-year-old gentleman presented to ophthalmic outpatient on August 31, 2020, with a sudden loss of vision in both eyes.

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He gave history of high-grade fever past 10 days. There was no history of trauma or preexisting comorbidities. In view of ongoing COVID-19 pandemic, he was considered to be COVID suspect. Examination was done as per strict protocol and subjected his throat swab for RT-PCR for COVID-19.

On ophthalmic evaluation, his vision was absent light perception in both eyes. Anterior segment was normal except for bilateral minimally reacting pupil of 5 mm. Fundus revealed clear media with normal disc and vessels and good foveal reflex in both eyes. There was no ptosis, ophthalmoplegia, or CNS-related symptoms such as altered sensorium, slurred speech, limb weakness, or convulsions. In suspicion of neuro-ophthalmic pathology, magnetic resonance imaging [MRI] of the brain was advised along with neurologic evaluation. Meanwhile, routine serological parameters were ordered.

In view of ophthalmic emergency, a provisional diagnosis of retrobulbar optic neuritis was made by a neurologist and first-dose intravenous methylprednisolone (IVMP) 1 g was started empirically while awaiting for MRI brain. It showed dumbbell-shaped T1/T2 hypointense lesion in sellar & suprasellar region with focal T1 hyperintensity suggestive of bleed. The lesion measured 3.4 cm × 3 cm × 2.4 cm, not separable from pituitary gland causing mass effect on optic chiasma [Fig. 1]. These findings along with clinical manifestations led to diagnosis of pituitary macroadenoma with apoplexy. RT-PCR for COVID-19 came positive same day evening and patient was admitted in COVID ward. IVMP was continued for 3 days.

Investigations: WBC count—5000/μL with ~80% granulocytes and 14% lymphocytes. C-reactive protein was elevated—47 mg/L while lactate dehydrogenase, troponin 1 and ferritin levels were normal. However, D-dimer levels were elevated—407 ng/mL. Serum electrolytes and renal function tests were normal. Chest X-ray showed bilateral lower lobe involvement. Treatment included intravenous antibiotics, multivitamin, low-molecular-weight heparin 40 mg once a day, oral zinc tablets, vitamin C, aspirin (75 mg), atorvastatin (20 mg), ivermectin 12 mg (once a day), and doxycycline 100 mg (twice a day). His saturation was maintained at 97% in room air. Pulse, temperature, saturation, and BP were regularly monitored. Neurosurgery opinion was taken.

After 3 days of IVMP, vision improved slightly in both eyes. On September 3, 2020, his vision was perception of light and hand movement in the right and left eyes. He was shifted to oral steroids. General condition improved and was discharged after 10 days with home quarantine for the next 14 days. At discharge, his vision was hand movements in right eye and 1/60 in the left eye with, fundus being normal. Patient is awaiting for neurosurgery.

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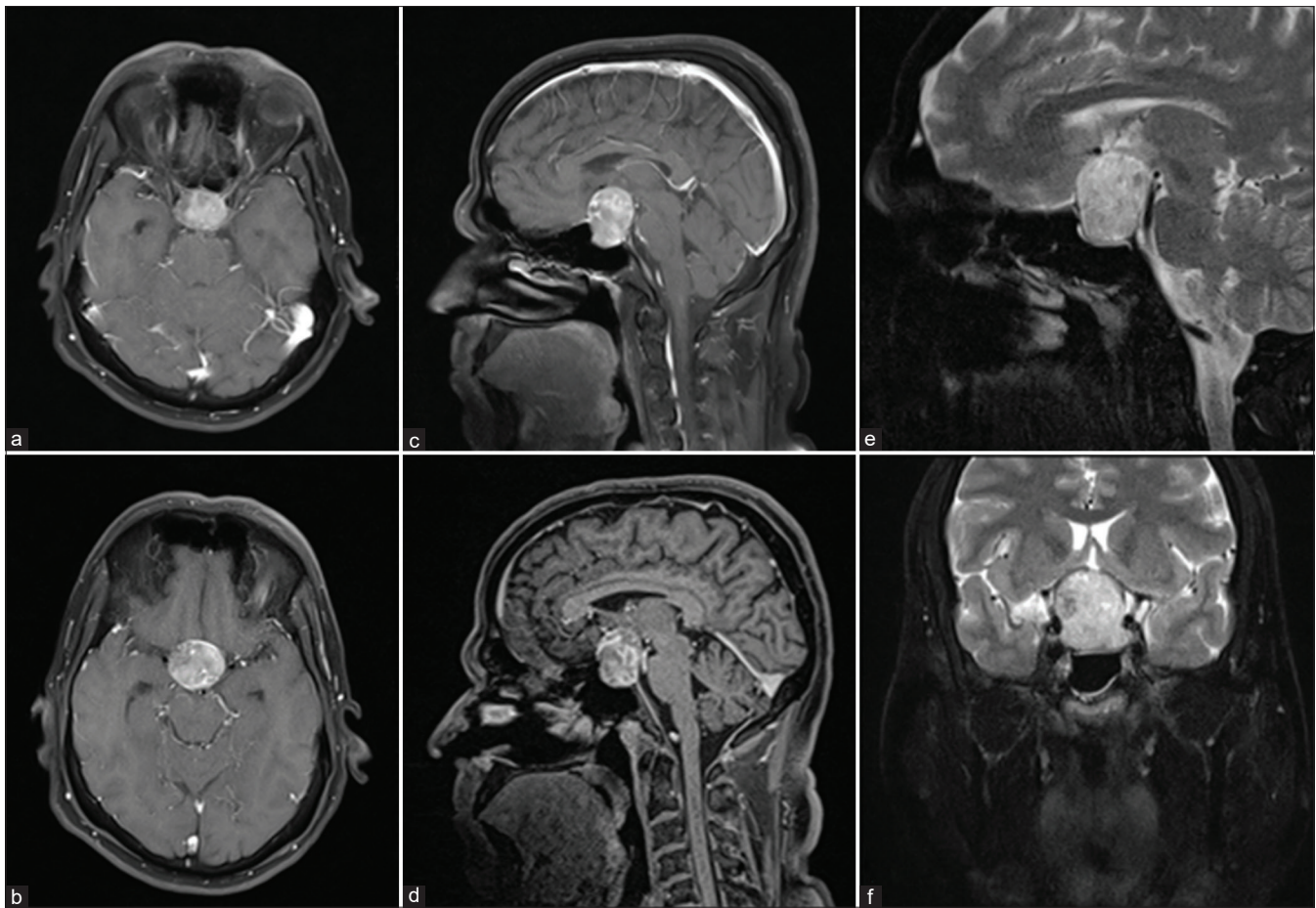


Figure 1: Magnetic resonance imaging of brain: (a and b) shows T1 weighted contrast image in axial view showing hyperintense lesion in sella and suprasellar region. (c and d) T1 weighted contrast image in sagittal view (e) T2 image in sagittal view showing compression on optic chiasma (f) T2 image in coronal view of lesion with heterogenous enhancement

Discussion

We discuss a case of pituitary apoplexy in an undiagnosed pre-existing macroadenoma with co-existent COVID-19 infection. SARS-COV2 primarily being a respiratory virus has been successful in involving multiple organ systems including cerebrovascular system. Our patient was an asymptomatic case of pituitary adenoma which was undetected previously, suggests a probability of a non-secretory one. Apoplexy is a rare condition affecting only 2-7% of all pituitary adenomas^[3] and is known to be precipitated by hypertension, medications, major surgeries, coagulopathies, infection or inflammation, head injury and so on.^[4] A case report highlights a case of pituitary apoplexy and stroke along with COVID positive status who succumbed to COVID-related complications.^[5] A case of pituitary apoplexy in 37-week pregnant and COVID-positive status is reported who was operated as per the guidelines and good outcome.^[6]

In our effort to understand pathophysiology of this neurologic phenomenon in COVID-19, we found multiple reports of cerebrovascular accidents like stroke, cerebral venous sinus thrombosis and hemorrhage. A Chinese cohort of 214 COVID-positive patients reports neurological symptoms in 36.4% of patients.^[7] CNS involvement in COVID-19 might be contributed to viral neurotropism, endothelial dysfunction,

coagulopathy and inflammation. Neurotropism can be explained by retrograde axonal transport via nasal cavity through cribriform plate and/or hematogenous spread by affecting blood-brain barrier.^[8]

Studies have confirmed that viruses can then bind to the human angiotensin-converting enzyme II (ACE II) receptors, which is a receptor for the virus spike protein expressed in cerebrovascular endothelial cells & regulate the sympathoadrenal system, vascular autoregulation, & cerebral blood flow. Disruption of this autoregulation is known to cause vessel wall rupture.^[9] Pituitary apoplexy here can be speculated either as a continuum of this disrupted autoregulation adding to list of neurological involvement in COVID or as a precipitating factor for the same. To add on, there is documented evidence of SARS-COV2 in cerebrospinal fluid.^[5]

Our case of apoplexy behaved differently from previous published reports. There were no preexisting symptoms of adenoma, and fever for a duration of 10 days followed by sudden loss of vision under setting of COVID infection points more in favor of COVID-associated apoplexy which otherwise would have gone unnoticed or presented later with visual field defects. Also with adequate COVID management and steroids his symptoms improved. Endocrinological guidelines has been published regarding management of pituitary tumors in

pandemic. It also suggests to rely on clinical picture for initial assessment and ensure hemodynamic stability along with glucocorticoids for control of inflammation.^[10]

Conclusion

This neuro-ophthalmic presentation of COVID-19 in ongoing pandemic, adds on to the spectrum of cerebrovascular involvement in COVID and a holistic approach in dealing such situations.

Declaration of patient consent

The authors certify that they have obtained all appropriate patient consent forms. In the form the patient(s) has/have given his/her/their consent for his/her/their images and other clinical information to be reported in the journal. The patients understand that their names and initials will not be published and due efforts will be made to conceal their identity, but anonymity cannot be guaranteed.

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Conflicts of interest

There are no conflicts of interest.

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