

A Unique Case of Bilateral Orbital Hematomas in the Setting of COVID-19: A Case Report

R. Hernandez Rubio, DO, F. Tsipenyuk MS-III & R. Sergott MD
Wills Eye Institute - Neuro-Ophthalmology Service
Philadelphia College of Osteopathic Medicine - Ophthalmology Residency Program

Overview:

The novel Coronavirus Disease-19 (COVID-19) was declared a pandemic in March 2020. Although initially thought to be a primary pulmonary disease, countless extrapulmonary manifestations have been identified. In this Case Report we discuss a 71 year old female presenting with bilateral orbital hematomas and adrenal hemorrhages shortly after recovering from COVID-19 infection.

Case:

A 71-year old female with hypertension and COPD developed COVID-19 infection in January 2022 and made a full recovery. She became significantly volume depleted with hyponatremia mid-February 2023 and was diagnosed with adrenal insufficiency.

Following a hydrocortisone injection, she developed an anaphylaxis requiring intubation and pressors. She was successfully extubated 24-hours later and reported double vision when she became aware of her surroundings.

Computed tomography (CT scan) of her orbits revealed bilateral, superior and medial hyper-dense masses consistent with orbital hematomas. Her superior ophthalmic veins were patent. She denied loss of central or peripheral vision.

Repeat CT scan were stable and the patient reported subjective improvement in her diplopia. Per her records, the etiology of her adrenal crisis was secondary to spontaneous hemorrhage into the adrenal glands. She was not on any anticoagulant or antiplatelet therapy prior to these events and her complete blood count was normal. Hematology/Oncology was consulted and no underlying bleeding diathesis was discovered.

Her diagnosis was bilateral spontaneous orbital hemorrhages following the identical timeline as the adrenal hemorrhages. The hemorrhagic event was attributed to a sequela of the COVID-19 infection. She was transitioned to and discharged on prednisone and sodium chloride tablets. She was advised to limit her free water intake to 1.2L daily.

Imaging:

CT orbits with contrast - Bilateral superior extraconal orbital hematomas, left greater than right. There is a mass effect on the globes and superior rectus muscles. The hematoma abuts the medial rectus muscle on the left. The superior ophthalmic veins are displaced inferiorly but patent. The globes are intact. The lenses are normally situated. No retrobulbar stranding. No acute fracture is seen. No pathologic enhancement. Mild proptosis left greater than right.

Neuro-Ophthalmic Examination:

Visual Acuity: 20/40 ph 20/30 OD; 20/50 ph 20/40 OS

Color Vision : 8/8 in each eye

Intraocular Pressure: 10 OD 12 OS

Pupils: No RAPD

Confrontation Fields: Full to count fingers

Extraocular Movements: 50% limitation in upgaze, 10% limitation in downgaze OD; 100% limitation in upgaze OS. The left eye also deviated down with abduction.

There was 3 mm of proptosis bilaterally and her left eye was displaced inferotemporally. There was $\frac{1}{2}$ retropulsion in the right eye and $\frac{3}{4}$ in the left eye. She had a ptotic in the left eye.

Slit lamp and dilated funduscopic exam was within normal limits.

Follow-Up:

She was re-evaluated by neuro-ophthalmology one month later. The patient reported significant improvement in her diplopia. There was still mild proptosis in the left eye. Her extraocular movements revealed a mild decrease in downgaze OD, 20% limitation in upgaze OS and a 6 prism diopter comitant exotropia.

Discussion:

Bilateral adrenal hemorrhages (BAH) have been identified and reviewed in only a handful of reports. Symptoms of BAH may be similar to those of COVID-19 (ie fever, nausea, malaise, etc). Non-traumatic adrenal hemorrhages were first identified in cases with septicemia (ie Waterhouse-Friderichsen Syndrome) and additional cases have been reported with CMV and Parvovirus infections. Our study, to our knowledge, reports the only documented case with BAH and bilateral orbital hematomas thought to be secondary to COVID-19 infection.

Although the mechanism is unclear it is thought that the severe hyperinflammatory response and cytokine storm play a major role in COVID-induced coagulopathies. The increase in systemic inflammation coupled with endothelial injury due to the virus attaching to the

angiotensin-2 receptor of endothelial cells and viral replication are also thought to play a major role in the prothrombotic risks in COVID-19. These systemic inflammatory processes brought by the COVID-19 infection likely contributed to this patient's presentation. Other risk factors include platelet activation, extended immobilization, mechanical ventilation and use of central venous catheters. This could have also elicited the BAH and orbital hematomas in our patient given that she developed an anaphylactic reaction to a hydrocortisone injection which led to intubation and pressors.

Thromboembolism has been well-documented in numerous patients with COVID-19 infections. In most cases, these patients are placed on anticoagulation and antiplatelet therapy; this was not the case in our case subject.

In conclusion, bilateral adrenal hemorrhages have been identified in only a handful of case reports and our research did not reveal any cases of simultaneous bilateral orbital hematomas.

References:

- Frankel, Meir et al. "Bilateral Adrenal Hemorrhage in Coronavirus Disease 2019 Patient: A Case Report." *Academic.oup.com*, Journal of Clinical Endocrinology and Metabolism , 1 Aug. 2020, <https://academic.oup.com/jcem/article/105/12/3745/5879684>.
- Zapatero Larrauri, Miriam, et al. "Case Report: Covid-19 with Bilateral Adrenal Hemorrhage." *The American Journal of Tropical Medicine and Hygiene*, U.S. National Library of Medicine, 17 July 2020, <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7470557/>.
- Elkhoully MBBS, Bilateral Adrenal Hemorrhage in a Man with Severe COVID-19 Pneumonia." *Radiology Case Reports*, Elsevier, 27 Mar. 2021, <https://www.sciencedirect.com/science/article/pii/S1930043321001692>.
- <https://www.tandfonline.com/doi/full/10.2147/OPHTH.S336600>.
- [https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370\(20\)30383-7/fulltext](https://www.thelancet.com/journals/eclinm/article/PIIS2589-5370(20)30383-7/fulltext).

References (AMA Format)

1. Frankel M, Feldman I, Levine M, et al. Bilateral adrenal hemorrhage in coronavirus disease 2019 patient: A case report. *The Journal of Clinical Endocrinology & Metabolism*. 2020;105(12):3745-3749. doi:10.1210/clinem/dgaa487
2. Álvarez-Troncoso J, Zapatero Larrauri M, Montero Vega MD, et al. Case report: Covid-19 with bilateral adrenal hemorrhage. *The American Journal of Tropical Medicine and Hygiene*. 2020;103(3):1156-1157. doi:10.4269/ajtmh.20-0722

3. Elkhoully MMN, Elazzab AA, Moghul SS. Bilateral adrenal hemorrhage in a man with severe COVID-19 pneumonia. *Radiology Case Reports*. 2021;16(6):1438-1442. doi:10.1016/j.radcr.2021.03.032
4. Wasfy TEE, Eldesouky MA, Serag Y, Elbedewy HA. Concurrent and post covid-19 ophthalmological implications. *Clinical Ophthalmology*. 2021;Volume 15:4467-4473. doi:10.2147/opth.s336600
5. Malas MB, Naazie IN, Elsayed N, Mathlouthi A, Marmor R, Clary B. Thromboembolism risk of COVID-19 is high and associated with a higher risk of mortality: A systematic review and meta-analysis. *EClinicalMedicine*. 2020;29-30:100639. doi:10.1016/j.eclinm.2020.100639