Title: Perimetry pitfalls in the era of COVID-19

Authors: Loulwah Mukharesh, M.D.¹, Nurhan Torun, M.D. FRCS(C)², Marc A Bouffard, M.D.¹²³

1. Department of Ophthalmology, Division of Neuro-ophthalmology, Massachusetts Eye and Ear Infirmary, Harvard Medical School, Boston MA.

2. Department of Surgery, Division of Ophthalmology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston MA.

3. Department of Neurology, Division of Neuro-ophthalmology, Beth Israel Deaconess Medical Center, Harvard Medical School, Boston MA

Corresponding Author:
Marc A Bouffard, M.D.
Beth Israel Deaconess Medical Center
Shapiro Building, 5th Floor Eye Clinic
98 Binney Street
Boston, MA 02215
Phone: 617-667-3391
Fax: 617-667-7092
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A 39-year-old woman followed-up in neuro-ophthalmology clinic for routine monitoring of previously-subclinical perineural enhancement OU (Figure 1) attributed to biopsy-proven neurosarcoidosis. The diagnosis of neurosarcoidosis was established in June 2019 following development of severe, progressive headache leading to recognition of nodular enhancing lesions along the folia of the right cerebellum, multiple cranial nerves, and extensive leptomeningeal enhancement leading to narrowing of the 4th ventricle and displacement of the medulla on MRI brain. MRI orbits revealed bilateral perineural enhancement. Biopsy of the right cerebellum revealed non-caseating granulomas. She made a full clinical recovery following initiation of corticosteroids and infliximab at a dose of 5mg/kg every 8 weeks.

Five neuro-ophthalmic examinations over the subsequent 14 months revealed normal afferent visual function, including automated perimetry. At routine follow-up 17 months after symptom onset, she denied ophthalmic and neurologic complaints. Afferent visual function remained normal with the exception of reliably-performed automated perimetry (Humphrey SITA 24-2 fast), which revealed new inferior arcuate defects OU and temporal blind spot enlargement OD (Figure 2.A). Note the importance of examining the total deviation and pattern deviation plots as the greyscale is normal. Funduscopic examination revealed normal appearing optic nerves, unchanged from baseline.

Relapse of neurosarcoid was suspected on the basis of the visual field defects noted in Figure 2.A. Infliximab levels returned within normal limits (46 mcg/mL, normal <1.0 mcg/mL) and repeat MRI of the brain and orbits with and without contrast did not demonstrate any evidence of active sarcoidosis. The patient returned 1 week later for repeat automated perimetry to ensure accuracy of findings prior to further diagnostic or therapeutic measures. Repeat perimetry was performed by a neuro-ophthalmologist (MAB), in contrast the prior study which was performed by an ophthalmic technician. The patient approached the perimeter with her mask on and, within several seconds of appropriate positioning on the chinrest, condensate formed on the trial lens in an inferior arcuate pattern. Following removal of her surgical mask, reliably-performed automated perimetry was normal through a condensate-free trial lens (Figure 2.B).

This condensate-related visual field artifact underscores the need to adapt usual techniques for visual field testing in the era of COVID-19. Similar phenomena have been reported in glaucoma clinics and it is important to recognize that these findings may be conspicuous enough to mimic neuro-ophthalmic disease, leading to unnecessary testing and even treatment. Condensate-related “fogging” of the trial lens should be added to the panoply of long-recognized causes of artifactual field defects including improper lens positioning (“rim artifact”), ptosis, dermatochalasis (lid artifact), inattention, and fatigue. Condensate-related artifact may be avoided by taping the superior aspect of the mask to the patient’s face, preventing egress of condensate onto the lens. Close, continuous observation of the patient by the ophthalmic technician or physician performing visual field testing is imperative. Mask-wearing in public places, including neuro-ophthalmology clinics, is likely to be required for the foreseeable future. Adaptation to this reality and maintenance of a high index of suspicion for artifactual visual field defects will minimize inefficiency in neuro-ophthalmic practice in the era of COVID-19.

References:


Figure 1. Axial (above) and coronal (below) T1 post-contrast MRI images demonstrating mild perineural enhancement OU shortly after initial diagnosis.
Figure 2. A) Humphrey visual field 24-2 showing bilateral inferior acruate defects (while wearing a surgical mask). B) Repeated Humphrey visual field 24-2 showing mild bilateral nonspecific deficits (without wearing surgical mask).
Statement of Authorship

Category 1:
a) Conception and design
Marc Bouffard
Loulwah Mukharesh
Nurhan Torun

b) Acquisition of data
Marc Bouffard

c) Analysis and interpretation of data
Marc Bouffard
Loulwah Mukharesh
Nurhan Torun

Category 2:
a) Drafting the manuscript
Marc Bouffard
Loulwah Mukharesh
Nurhan Torun

b) Revising it for intellectual content
Marc Bouffard
Loulwah Mukharesh
Nurhan Torun

Category 3:
a) Final approval of the completed manuscript
Marc Bouffard
Loulwah Mukharesh
Nurhan Torun