Abstract Title
Monocular Complete Hemianopsia Secondary to Multiple Traumatic Brain Injuries

Abstract Text
A patient presented with hazy peripheral vision OD. Repeated visual field testing confirmed a monocular temporal hemianopsia OD. This report outlines the presentation of a monocular temporal hemianopsia due to multiple traumatic brain injuries.

I. Case History
Patient Demographics
- 55 year-old Caucasian male

Chief Complaint
- Hazy temporal peripheral vision right eye
  - Stable symptoms since onset
  - Onset after multiple traumatic brain injuries between 1982-1984

Ocular History
- Saccadic dysfunction
- Pursuit dysfunction
- Mild cataracts
- Dry eye symptoms
- Low risk glaucoma suspect

Medical History
- Osteoarthritis, hypertension, psoriasis, cluster headaches

History of Traumatic Brain Injury (TBI)
Three incidents of TBI between 1982-1984 without medical treatment at time of incidents:
  - hit on head with steam pipe with loss of consciousness of unknown time
  - hit on head with ricocheted shrapnel of pressure bearing with loss of consciousness of unknown time
  - hit head on lifeboat with loss of consciousness of unknown time

Medications
- Lisinopril

Mental Health Evaluation
- Post-traumatic stress disorder, negative suicidal/homicidal thoughts

II. Pertinent Findings
Initial Polytrauma Screening with findings:
BCVA OD 20/20, OS 20/20+2
Pupils: Physiological anisocoria OD>OS, absence of afferent defect
Full Field 120-point screener:
  - Complete right hemianopsia OD
  - Scattered right edge defects superior>inferior OS

Ophthalmoscopy:
  - Nerve cup-to-disc ratio OD 0.6H/V, OS 0.55H/V, no pallor/edema
  - Macula: unremarkable OU

Cirrus HD-OCT:
  - ONH (Optic Nerve Head) and RNFL (Retinal Nerve Fiber Layer)
  - Analysis Disc Cube:
    - OD, OS: Borderline RNFL thickness inferior quadrant
Ganglion Cell Analysis: equal average thickness OD=OS with all sectors borderline/outside normal limits, except nasal
Macular Cube 512x128: equal central and average thickness OD=OS with symmetrical sectors
OD, OS: superior and inferior outer sectors outside normal, temporal outer sectors borderline
HVF 30-2, SITA-Standard: excellent reliability OU, defects repeatable on 2 visits
OD: Deep complete temporal hemianopsia
OS: Shallow superior-nasal cluster

Magnetic Resonance Imaging (MRI) Interpretation 04/16/15
1. No acute intracranial abnormalities.
2. Prominence of retrocerebellar cerebrospinal fluid space may relate to mild posterior fossa volume loss.

III. Differential Diagnosis
Primary: Monocular temporal hemianopsia secondary to traumatic brain injury
Others: monocular temporal hemianopsia secondary to retinochoroidal coloboma, pituitary adenoma, meningioma, astrocytoma, craniopharyngioma with or without optic neuritis, functional overlay

IV. Diagnosis and Discussion
Monocular hemianopsia is a category of visual field defect first described by Eskridge in 1885 in a young patient with progressive psychological and physical disabilities. This patient demonstrated a temporal hemianopsia OS secondary to a nodular tumor on the right hemisphere of the cerebellum causing likely compression of the occipital lobe. Since this article, only case reports of monocular hemianopsias have been reported with a few papers relating this finding to a history of TBI. The differential for etiology of this field defect varies: functional, branch retinal artery occlusion, history of surgery for pituitary adenoma, traumatic optic neuropathy, meningioma, and craniopharyngioma. The pupil pathway may or may not be affected based upon the area of compression if a mass lesion is suspected; anatomically, the pretectal olivary nuclei accepts contralateral projections in a greater ratio compared to ipsilateral. In this patient, normal optic nerve appearance, absence of afferent pupillary defect, and lack of abnormalities noted on MRI indicate that this repeatable complete monocular temporal hemianopsia is likely due to unspecified post-chiasmal damage. It is also a possibility that a lesion too small for imaging on MRI may be present. Given the multiple episodes of TBI and loss of consciousness with each event, onset of visual symptoms after TBIs, and normal ocular findings, the monocular temporal hemianopsia is likely associated with TBI.

V. Treatment and Management
The patient is being followed by primary care optometry every 6 months to monitor for changes to the visual field. Fundus appearance remains unchanged and follow-up will include a HVF 30-2 to monitor for changes to the monocular temporal hemianopsia OD and color vision testing. Due to limited literature on the topic and range of etiology behind this visual field defect, there is no standard of management for these patients aside from neuro-imaging and slight mobility and orientation adaptations to functional visual field. There has been one case report of successful utilization and image shift of monocular prism with the base oriented to the hemianopic side of the affected eye.

VI. Conclusion
Monocular hemianopsia due to TBI stands as a rare finding that may be used in conjunction with other symptoms and examination to determine further neurological damage and potentially highlight certain areas for imaging. This finding presented with a normal ocular health exam and absence of afferent pupillary defect. The incidence of
monocular hemianopsia and its symptoms may be under-reported as patients can compensate for the field loss with binocular viewing.

Citations

Residency Affiliation: Veterans Affairs Palo Alto Health Care System
Residency Name and Location: Primary Eye Care/Brain Injury Vision Rehabilitation; Veterans Affairs Palo Alto Health Care System
Available images:
Cirrus HD-OCT ONH and RNFL Disc Cube, Macular Cube 512x218, Ganglion Cell Analysis OU
Humphrey Visual Field SITA-Standard 30-2, Full Field-120 OU
Fundus photos OU
Magnetic resonance imaging of brain without contrast

Authors:
Tracy Wang OD
Lee Vien OD, FAAO
David Yang OD, FAAO