Title: Left Homonymous Quadrantanopia secondary to retained ballistic fragments in the Right Temporal/Occipital lobe: A Case Report

Abstract: Homonymous visual field defects with corresponding ganglion cell loss on OCT are observed in cases of cerebral damage. In the following case, CT scan reveals retained bullet fragments from a gunshot wound to the skull.

I. Case History

- Patient demographics
  - 68 year old black male
- Chief complaint
  - Patient reports constant blur while reading, gradual worsening over past few months
- Ocular history
  - Cataracts OU, simple hyperopia with presbyopia OU
- Medical history
  - Unremarkable
- Medications
  - None

II. Pertinent findings

- Clinical

Initial visit: Jan 2016

- BCVA 20/20 OD, OS, OU
- EOMs: full and smooth OU
- Confrontation fields:
  - OD: superior nasal constriction
  - OS: superior temporal constriction
- Pupils: Equal, round and responsive to light OU with no relative afferent pupillary defect
- Slit lamp exam: Unremarkable OU
- Goldmann applanation tonometry:
  - OD: 17 mmHg
- OS: 16 mmHg
  - DFE
    - OD: ONH: C/D .55 (-) pallor/edema
    - OS: ONH: C/D .40 (-) pallor/edema
    - OU: Macula- flat and intact; Vessels- normal course and caliber; periphery unremarkable (-) breaks/detachments 360
  - OCT
    - RNFL analysis: Unremarkable OD, OS
    - Ganglion cell analysis: shows symmetric GC loss inferior temporal OD and GC loss inferior nasal OS
  - Humphrey visual field SS 30-2: March 2016
    - Left homonymous quadrantanopsia

2nd Visit: April 2016

- Gonioscopy: Open to PTM 360 OD; Open to ATM inferior and PTM in all other quadrants OS
- Pachymetry: OD: 557 um OS 549 um
- Patient reports at this visit that he forgot to mention that on 12/31/2015, he was involved in an incident where he was shot in the back of the head and he is unsure whether the bullet penetrated or grazed the back of his head
  - CT scan with and without contrast was ordered

- Physical
  - Patient denies any stroke related symptoms
  - Residual shoulder/neck pain from incident

- Laboratory studies
  - Chem 7 (prior to CT scan)- all within normal limits

- Radiology studies
  - CT scan reveals radio-opaque foreign body suggestive of bullet fragments, in the right temporal and occipital lobe.

III. Differential diagnosis

- Primary/leading
  - Cerebrovascular accident
  - Retained fragments of bullet
  - Traumatic brain injury
  - Brain tumor

- Others
  - Alzheimer's disease
  - Arteriovenous malformation
  - Cortical basal ganglion degeneration
  - Creutzfeldt–Jakob disease
  - Epilepsy
  - Lymphoma
  - Mitochondrial encephalomyopathy, lactic acidosis, and stroke-like episodes
  - Metastasis of hepatocellular carcinoma
  - Multiple sclerosis
  - Neuromyelitis optica
  - Neurosurgical procedures
  - Neurosyphilis
  - Progressive multifocal leukoencephalopathy
Shaken baby syndrome
Vertebrobasilar dolichoectasia

IV. Diagnosis and discussion

- Elaborate on the condition/unique features
  - Retained bullet fragments in the temporal/occipital lobe corresponding to left homonymous quadrantanopia.
  - Studies indicate that in neurologic conditions, such as stroke where cerebral damage has occurred, corresponding ganglion cell layer and inner plexiform layer thinning can occur.
  - This case is unique in that the patient’s only notable sequelae of the retained bullet fragments was a visual field defect that he had not even noticed.

V. Treatment, management

- Treatment and response to treatment
  - Patient was evaluated by neurology following CT scan. Surgery is not indicated because the bullet fragments are not causing any major issues at this time. Continue to monitor.

- Bibliography, literature review encouraged
    http://www.ncbi.nlm.nih.gov/pmc/articles/PMC4181645/
    https://www.hindawi.com/journals/joph/2016/2394957/

VI. Conclusion

- Clinical pearls, take away points if indicated
  - Symmetric and corresponding visual field defects can be noted as ganglion cell loss on OCT.
  - It is important to realize that there are many etiologies of homonymous quadrantanopia. A detailed history, visual field and imaging can aid in proper diagnosis.