

Pearls, Trick Questions and Head Scratchers: Cases in Neuro-optometry

The Case of the Vision Robbing Cat Burglar

Unilateral sudden loss of vision in an 18 year old female in otherwise good health is examined in an urgent care setting. A unilaterally swollen optic nerve head requires systemic evaluation to rule out an underlying cause. Neuroretinitis secondary to cat scratch disease is discussed.

- I. Case History
 - a. 18 year old white female
 - b. Sudden onset dark spot in central vision of the left eye
 - c. Mild photophobia
- II. Pertinent findings
 - a. Acuity reduced to count fingers at 3.5 feet in the left eye
 - b. 2+ APD OS
 - c. EOM full with no pain on eye movement
 - d. Extensive visual field loss OS
 - e. Unilateral swollen optic nerve with hemorrhages and cotton wool spots left eye
 - f. Macular wing
- III. Differential diagnosis unilateral swollen optic nerve head
 - a. AION
 - b. Anterior optic neuritis
 - c. Diabetic papillitis
 - d. Papillophlebitis
- IV. Diagnosis and discussion
 - a. Neuroretinitis secondary to Bartonella Henselae infection.
 - b. Neuroretinitis is an anterior optic neuritis with associated macular star. Almost always an infectious etiology.
- V. Treatment and management
 - a. Self limiting within six to twelve months.
- VI. Conclusion
 - a. The patient had complete resolution within two months of onset of symptoms.
 - b. Neuroretinitis is highly unlikely to be associated with demyelinating disease as opposed to optic neuritis.

The Case of the Deadly Vertigo

Swollen optic nerves require neural imaging to rule out intracranial lesions. Glioblastoma multiforme is the most common primary intracranial tumor. Treatment options include surgical debulking, radiotherapy and chemotherapy with mean survival duration of .7 years.

- I. Case History
 - a. 34 year old white female graduate student
 - b. Sudden onset horizontal diplopia, headaches and a rushing sensation upon standing.
 - c. Meclazine for benign postural vertigo
 - d. Unexplained 20-30 pound weight gain over the past few months.
- II. Pertinent findings
 - a. Bilateral swollen optic nerve heads, occasional diplopia in left lateral gaze
 - b. Overweight
 - c. No laboratory studies
 - d. CT scan and MRI reveal tumor in left occipital lobe

- III. Differential diagnosis of bilateral swollen optic nerve heads
 - a. Pseudotumor cerebri
 - b. Space occupying intracranial mass
- IV. Diagnosis and discussion
 - a. The patient was diagnosed with an enhancing lesion in the left occipital lobe. A tumor biopsy identified the mass as glioblastoma multiforme which is a stage IV astrocytoma.
 - b. Glioblastoma multiforme is the most common primary brain malignancy. Although medical technology has advanced greatly during the previous 20 years, survival rates have remained fairly constant. Outside survival estimates are placed at 3 years with 5 years being exceptional. Of interest is that patients under 40 have an 18 month survival rate of 50%.
- V. Treatment and management
 - a. Patient was not a candidate for tumor debulking due to location and patient concern for loss of mental function.
 - b. She received external beam radiation therapy and concurrent temozolomide.
- VI. Conclusion
 - a. The patient died 10 months after the diagnosis of elevated optic nerve heads was made.
 - b. A neurologic history and work-up is extremely important when identifying a patient with elevated optic nerve heads.

The Case of the Map to the Buried Treasure

A 24 year old white female presents with bilaterally elevated optic nerves with visible drusen in one eye only pose a clinical conundrum. Her 50 pound weight gain in the past year and multitude of systemic medications confounds the clinical picture. A case of bilateral optic nerve head drusen versus idiopathic intracranial hypertension is discussed.

- I. Case History
 - a. A 24 year old female presents for routine care
 - b. Bipolar disorder with multiple medication changes
 - c. History of 50 pound weight gain in the past year
 - d. No neurologic symptoms
 - e. No previous diagnosis of ONH drusen
- II. Pertinent findings
 - a. Bilaterally raised optic nerve heads
 - b. Visible drusen in the right eye only
 - c. No spontaneous venous pulsation
 - d. Enlarged blind spots in each eye on visual field analysis
- III. Differential diagnosis of bilateral swollen optic nerve heads
 - a. Idiopathic intracranial hypertension
 - b. Papilledema
 - c. Bilateral buried optic nerve head drusen
- IV. Diagnosis and discussion
 - a. The patient was examined with an OCT and bilateral ONH drusen were identified.
 - b. B-Scan is commonly used to identify drusen although OCT can be used when B scan is unavailable
 - c.
- V. Treatment and management
 - a. Follow visual fields for progression
- VI. Conclusion
 - a. The visual field remained stable
 - b. Patients with ONH drusen are bilateral in 66-90% of cases

- c. Optic Nerve head drusen and other causes of bilaterally elevated optic nerve heads can present simultaneously and must be considered.

The Case of the Panicking Pupil

An 18 year old woman presents with a non-reactive dilated pupil. Sudden onset pupil dilation can pose an emergent clinical situation that the optometrist must evaluate and act on appropriately. A rare case of trauma induced internal ophthalmoplegia with accommodation sparing is discussed.

- I. Case History
 - a. 18 year old white female NCAA water polo player
 - b. Sustains a blow to her right eye during competitive play
 - c. Lid laceration is present with marked upper lid edema
 - d. Management for first four days post trauma is by urgent care physicians.
 - e. On day four reduced lid swelling reveals a fixed and dilated pupil.
 - f. The urgent care MD refers the patient to optometry to determine if a brain scan is indicated.
- II. Differential diagnosis of a dilated and non-reactive pupil
 - a. Pharmacologic
 - b. Iris sphincter tear
 - c. Third nerve palsy
 - d. Adie's tonic pupil
 - e. Traumatic internal ophthalmoplegia
- III. Pertinent findings
 - a. 9mm fixed right round pupil
 - b. EOMs are full and unrestricted with no diplopia
 - c. Accommodation is present and equal to left eye
 - d. Convergence does not result in pupil constriction
 - e. Pupil constricts with 1% pilocarpine
- IV. Diagnosis and discussion
 - a. The patient was diagnosed with traumatic internal ophthalmoplegia with accommodation sparing.
 - b. The parasympathetic fibers that innervate the iris sphincter and ciliary body synapse in the ciliary ganglion, run with the short ciliary nerves and move anteriorly in the suprachoroidal space. Case reports have documented damage to these fibers, in patients receiving laser PRP under local anesthetic, resulting in pupil dilation and loss of accommodation. In this patient the parasympathetic nerves appear to have been concussed by the blow to the eye resulting in a loss of innervation to the iris sphincter and resulting in a fixed and dilated pupil.
- V. Treatment and management
 - a. The patient did not receive a brain scan.
 - b. She was provided pilocarpine 0.5% prn to be used for outdoor water polo practice.
 - c. Her pupil slowly regained function but remained larger than the left eye.
- VI. Conclusion
 - a. This case concludes that although in most cases dilation and loss of accommodation are coupled in internal ophthalmoplegia it is possible to have damage so localized that it reduces function in only one of the innervated structures.

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