THE WILD AND WACKY WORLD
OF NEURO-OPHTHALMOLOGY

M. Tariq Bhatti, MD
Departments of Ophthalmology and Medicine (Division of Neurology)
Duke University Eye Center and Duke University Medical Center

Consultant, Grant and Honorarium Support

- EMD Serono
- Pfizer
- Biogen Idec
- Bayer Healthcare
- Novartis Pharmaceuticals

NO CONFLICTS OF INTEREST

OUTLINE

Photography and Neuro-Ophthalmology

- Photography
  Fundus
  External
  Eye Movements
- Pupillography
- Optical Coherence Tomography
- Ultrasonography
- Intravenous Fluorescein Angiography
- Magnetic Resonance Imaging
- MRA/MRV
- Computed Tomography
- CTA/CTV
- Cerebral Angiography
- Pathology

The good physician treats the disease; the great physician treats the patient who has the disease.
Sir William Osler, 1849-1919.

42 yo CM with 6 day history of binocular and horizontal diplopia

- Diplopia initially only in lateral gaze→ progressed to primary gaze
- Family doctor: diagnosed sinusitis treated with erythromycin
- Ophthalmologist: referred to Duke for evaluation
  - POH/PSH: congenital color blindness
  - PMH: remote history of head trauma
  - Medications: nose spray as needed for allergies
  - FMH: stroke
  - SH & ROS: unremarkable

Wall-Eyed

Wall-Eyed
Diplopia initially only in lateral gaze→ progressed to primary gaze

Family doctor: diagnosed sinusitis treated with erythromycin

Ophthalmologist: referred to Duke for evaluation

- POH/PSH: congenital color blindness
- PMH: remote history of head trauma
- Medications: nose spray as needed for allergies
- FMH: stroke
- SH & ROS: unremarkable
Wall-Eyed

Bilateral Internuclear Ophthalmoplegia (INO)

CLINICAL-RADIOLOGICAL-ANATOMICAL CORRELATION

CLINICAL-RADIOLOGICAL-ANATOMICAL CORRELATION
12-year-old girl with 3 month history of intermittent diplopia. Binocular, not sure if horizontal or vertical diplopia
Frequency: 6 times/day
Duration: seconds

Past medical history: hypothyroidism
Past neurological history: partial resection of medulloblastoma 5 years ago
craniospinal radiation: 5580 cGy
chemotherapy: cisplatin, CCNU and vincristine
Medications: Synthroid
Family history: mother with strabismus

EXAMINATION

Visual acuity: 20/25 right eye
20/20 left eye
Color vision: 9/10 each eye

Pupils: equal, briskly reactive, without a relative afferent pupillary defect

Adnexa: no ptosis or proptosis

Slit-lamp: normal
Cranial nerve: normal
Fundus: normal

STUCK TO THE RIGHT

OCULAR NEUROMYOTONIA
**OCULAR NEUROMYOTONIA**

- Paroxysmal involuntary contraction of the extraocular muscles resulting in intermittent diplopia and ocular misalignment
- Tonic discharge of one of the ocular motor cranial nerves
- Most common ocular motor cranial nerve involved: CN III
- Intermittent diplopia with duration of seconds to minutes
- Precipitated (induced) by change in gaze (in some cases)
- Overaction of extraocular muscle resisting ipsilateral antagonist muscle (eye “stuck”)

**FUNNY TASTE IN MY MOUTH**

54-year-old man with 10 day history of:
- right periorbital pressure pain
- right scalp pain
- sore throat
- metallic taste

Symptoms began shortly after a fishing trip where he was bitten by a Spanish mackerel.

**CLINICAL FINDINGS**

54-year-old man with:
- right pupillary miosis
- right upper eyelid ptosis
- periorbital pain
- scalp pain
- sore throat
- metallic taste

1. What is the clinical diagnosis?  — Painful partial Horner’s
2. Where is the lesion causing #1?  — Internal carotid artery
3. What is the etiology of #2?
HORNER’S SYNDROME
Characterized by:
- ipsilateral ptosis
- miosis
- facial anhydrosis

- 1st order neuron (brainstem + SC)
- 2nd order neuron (preganglionic)
- 3rd order neuron (postganglionic)

DYSGUESIA

THE TEACHER AND THE PUPIL

49 yo BF (kindergarten teacher) with 1 week history of left head pain radiating to left eye.
2 days later noticed left upper eyelid ptosis and double vision.
Primary physician ordered CT brain without contrast-normal.

Past medical history: none
Past neurological history: migraines
Medications: Imitrex prn
Family history: None
A 72-year-old previously healthy woman noted left eye pain.

Ocular pain progressed to involve left head and face.

One month later: noted ptosis of left upper eyelid.

One month later: developed double vision.

Diagnosed with a left third cranial nerve palsy.

Cerebral angiogram confirmed an aneurysm at the junction of the left superior cerebellar and posterior cerebral arteries.

THE TEACHER AND THE PUPIL

ANEURYSMAL PUPIL INVOLVING THIRD CRANIAL NERVE PALSY
July 2001

One week following endovascular embolization treatment patient referred to the Neuro-ophthalmology Clinic

October 2002

July 2001

October 2002

July 2002

Feb 2002

July 2002
THIRD NERVE PALSY EXACERBATION DUE TO ANEURYSMAL REGROWTH

THAT'S A WRAP

59-year-old white female woke up 8 days prior to visit with loss of half the vision in both eyes
Past ocular history: none
Past medical history: anxiety, depression and GERD
Past surgical history: Sept 5, 04-
left MCA aneurysm (cerebral infarction and hypotension)
Sept 27, 04-
right MCA aneurysm
right MCA bifurcation aneurysm
right ICA termination aneurysm
Visual Acuity: 20/100 OD, 20/30 OS
Color Vision: control OD, 9/10 OS
Pupils: Equal, reactive. No RAPD
Slit-Lamp: early cataracts OU
Intraocular pressure: 10 OD, 12 OS
Adnexa: normal
Eye Movements: Full OU
Neurological and Cranial nerve examination: normal
Dilated Fundus: normal

59-year-old white female woke up 8 days prior with loss of half the vision in both eyes
Past ocular history: none
Past medical history: anxiety, depression and GERD
61 yo WF referred for evaluation of ischemic optic neuropathy OD in setting of acute onset decreased VA

POH: Amblyopia OS, ON Drusen OU, PVD OD
PMH: HTN, HL, carpal tunnel
Meds: Lipitor, Diltiazem, Spironolactone, Lunesta, Zyrtec
Social History: denies alcohol, tobacco, drugs
Family History: AMD, glaucoma

VA < 20/70 20/50 PH 20/40
subtle RAPD OD
IOP < 14
Color Plates < no control
EOM: full
SLE: 1+NS, otherwise unremarkable OU
Cranial nerves: normal
KNEE DEEP IN THE NERVE

Malignant Optic Nerve Glioma
72-year-old monocular white woman with decreased vision right eye for 2 days.

2 months prior- poor appetite, jaw pain, sharp pain across forehead, ears and throat.

1 week prior- developed blisters on right scalp, diagnosed with shingles.

Past medical history: hypertension
Medications: Atenolol, Lipitor, Valtrex

Examination:
Vision: 20/50
Pupil reactive to light
Extraocular movements full

ESR: 108 mm/h
GIANT CELL ARTERITIS

- Clinical Suspicion
- Systemic and Ocular manifestations occult GCA: 20%
- Laboratory data normal ESR: 15-20%
- Superficial temporal artery biopsy

SUPERFICIAL TEMPORAL ARTERY BIOPSY

THE WILD AND WACKY WORLD OF NEURO-OPTHALMOLOGY

1. Eye Movements
   a. Wall-Eyed
   b. Stuck to the right
2. Pupil
   a. Funny taste in my mouth
   b. The teacher and the pupil
3. Aneurysm
   a. Re-coiled
   b. That’s a wrap
4. Optic nerve
   a. Knee deep in the nerve
   b. Really big cells

1. Eye Movements
   a. Bilateral INO
   b. Ocular Neuromyotonia
2. Pupil
   a. Internal carotid artery dissection
   b. Aneurysmal third nerve palsy
3. Aneurysm
   a. Recurrent aneurysm
   b. Muslinoma
4. Optic nerve
   a. Malignant optic nerve glioma
   b. Giant cell arteritis