

1 Neuro-ophthalmology:

The basics

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2 Who is Dr. Agarwal???

- Neuro-ophthalmology
 - ◆ Cranial nerve palsies
 - ◆ Optic neuropathies
 - ◆ Brain tumors
- Ocular plastics
 - ◆ Lid lesions
 - ◆ Ptosis
 - ◆ Orbital tumors
- Adult Strabismus

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5 Skin Cancer

6 Right Sixth and Seventh Palsy

7 Plain Old Droopy Eyelids

8 History of Present Illness

- Time course:

Was it sudden? Or was it slow and progressive??

Was there associated pain?

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- Are both eyes involved?

- Have you ever had this before??
- Are you having other neurological problems?
Examples: headaches, paralysis, hearing loss....

10 Review of Systems

- Fatigue
- Malaise
- Jaw claudication
- Weight loss
- Anorexia
- Scalp tenderness

11 Past Medical History

- Very important...
- HTN
- DM
- Heart Disease

12 Medications

- Can be “toxic” to the optic nerve!
- Ethambutol
- Viagra, Levitra, Cialis...!!!

13 Exam

- Vision: BEST CORRECTED!
- Pressure
- Pupils
 - ◆ Anisocoria
 - ◆ Afferent Pupillary Defect

14 Pupils!

- Best of itself!

- Must swing muscle light evenly and briskly
- Easy to create one!
- Careful in cases of strabismus

15 **Orbital Exam**

- Is there proptosis?
- Does the eyeball give to gentle pressure?
- Is there a bruit?

16 **Motility Exam**

- Ductions?
- Versions?
- Comitant?

17 **Visual Field**

- Confrontation
- HVF 30-2

18 **Optic Nerve Exam**

- Is it normal in size or small??
- Are there signs of swelling?
- Are the vessels normal in appearance??

19 **TEMPORAL ARTERITIS**

20 **TEMPORAL ARTERITIS**

21 **ANTERIOR ISCHEMIC OPTIC NEUROPATHY**

- Is it temporal arteritis?

22 **AION: IS IT TEMPORAL ARTERITIS?**

23 **ANTERIOR ISCHEMIC OPTIC NEUROPATHY**

24 **TEMPORAL ARTERITIS**

- 25 TEMPORAL ARTERITIS
- 26 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- 27 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC
 - ◆ Disc edema often pale may be chalk-white
 - ◆ C/D ratio normal
 - ◆ May see peripapillary choroidal ischemia (blur)
- 28 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIS: LATE CUPPING OPTIC NERVE
 - ◆ Rare in NAION
 - ◆ If fellow eye excavated, consider AAION
- 29 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- 30 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC
 - ◆ If AION has associated cilioretinal artery occlusion, suspect temporal arteritis
- 31 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- 32 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC FA
- 33 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC FA: CHOROIDAL ISCHEMIA
 - ◆ Fundus may show no visible disc edema
 - ◆ Choroid edematous
- 34 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC FA: CHOROIDAL ISCHEMIA
 - ◆ Widespread choroidal nonfilling; disc fills normally, peripapillary retinal leakage
- 35 AION: IS IT TEMPORAL ARTERITIS?
- 36 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- 37 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- 38 ANTERIOR ISCHEMIC OPTIC NEUROPATHY
- ARTERITIC: TEMPORAL ARTERY BIOPSY

◆ Positive biopsy proves diagnosis

39 ANTERIOR ISCHEMIC OPTIC NEUROPATHY

40 ANTERIOR ISCHEMIC OPTIC NEUROPATHY

41 ANTERIOR ISCHEMIC OPTIC NEUROPATHY

42 ANTERIOR ISCHEMIC OPTIC NEUROPATHY

43 AION: IS IT TEMPORAL ARTERITIS?

44 AION: IS IT TEMPORAL ARTERITIS?

45 Case

■ 25 year-old Caucasian male referred for worsening 3rd nerve palsy OS x 2 months

■ Va 20/20 OU

■ Pupils equal, round OU

■ PF 10, 3: previously 6 mm OS

46

■ EOM: Worsening!

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48

■ MRI negative

■ MRA negative

49

■ Here is a patient who is young with a worsening 3rd nerve palsy, evolving over a few MONTHS!

50

■ If it were inflammatory or viral, he would be better over months, not worse!

- Ischemic palsy in your 20's??

- Any other thoughts?

51

- Myasthenia gravis
- MS
- Graves' disease

52 **Myasthenia Gravis**

- Autoimmune disorder in which the body makes autoantibodies for the acetylcholine receptor
- Characterized by severe fatigue of muscles
- Women in 20's and 30's and men over 60

53

- Severe fatigue which improves with rest
- Eye muscles: ptosis, diplopia
- Facial muscles: transverse smile, difficulty chewing, swallowing
- Trunk: limb weakness, respiratory

54 **How to check...**

- Cogan's lid twitch
- Bienfang's
- Squeeze against your forceful opening

55 **Testing**

- Tensilon: acetylcholinesterase inhibitor to see if diplopia or ptosis improves....improved

- Acetylcholine receptor antibody: 3.0 with a reference range of <0.1

56 **Treatment**

- Thymus (can make antibodies) needs to be imaged and removed if enlarged
- Start Mestinon: oral anticholinesterase

57 **Case**

- 11 year-old Caribbean female presents with 3-day history of partial ptosis OD and binocular horizontal diplopia.
- Fallen on camping trip, fear of brain injury or aneurysm
- Denies pain, headache, any past medical history

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- Pupils are equal without APD OU
- Eyelid:
Palpebral fissure 10 mm OD, 4mm OD
Levator Function, 18 mm OD, 7mm OS
- No proptosis or orbital erythema

59

- SLE: unremarkable
- EOM: OS no adduction, otherwise full

60 **Photo**

61

- MRI and MRA was brought in, negative

62

- 1 week later, completely resolved
- VIRAL 3rd nerve palsy!!!

63 **CN 3 palsy**

- Oculomotor Nerve

- ◆ Medial Rectus
- ◆ Inferior Rectus
- ◆ Superior Rectus
- ◆ Inferior Oblique
- ◆ Levator Muscle

64 **Work-up**

- Rule out other neurological signs
- If isolated, Pupil involvement?
- If yes, emergent imaging

65 **Testing**

- Watch for pupil if partial
- Remember myasthenia gravis
- Viral common in children

66 **Treatment**

- In this case, observation
- If aneurysm, clip or coil
- If normal pupil and complete with ischemic risk factors, observe
- If anything funny, image!

67 **Case**

- 65 year-old Caucasian male with binocular horizontal diplopia for 5 days.
- Diabetes
- Hypertension
- A bit obese

68

- Pupils
- IOP
- Anterior and Posterior segments are normal

69

- No proptosis, tenderness
- EOM: 10 PD ET

18 PD ET in left gaze

3 mm abduction deficit in left gaze

70 Photo

71 Slam Dunk or is it??

- Of course, microvascular 6th nerve palsy!

- Patient was observed for one month and sent to Loma Linda for evaluation.

72 MRI

73

74 What lies beneath

- Cavernous sinus usually involves multiple nerves
- Meningiomas
- Vascular abnormalities

75 Case

- 45 year-old Chinese female referred for “broken down phoria”
- Pt states never had a problem with double vision until recently.
- No personal or family history of strabismus

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- Past Medical History: Hypertension
- Past Surgical History: Blepharoplasty done 3 months ago

77 Exam

- Vision 20/20 OU

- IOP nl OU

- Orbital exam nl

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83 Broken Down Phoria???

- Adhesion and scarring of the inferior oblique and inferior rectus

- Only solution is lysis of adhesions and scar

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86 Case

- 55 year-old complaining of worsening visual acuity OS x 2 years

- PMH: Hepatitis C

- Meds: Interferon

- PSH: HEAVY drugs and alcohol x 25 years, clean for the last 12 years.

87

- Va cc 20/25 OD, 20/60 OS

- Normal color OD, No plates OS

- 1+ APD OS

88

- Normal external exam

- Normal eye movements.

- Normal anterior segments.

89 Optic Nerves

90

- Is this interferon optic neuropathy?
- Is this tobacco-alcohol amblyopia
- Is this AION??

91 Visual Fields

92 MRI

93 MRI

94 Large Meningioma!

95 Symptoms of Sellar Masses

- Headache
- Decreased libido
- Galactorrhea
- Gynecomastia

96 Signs

- Vision loss
- Optic nerve pallor or edema
- Bitemporal hemianopsia!!

97 Treatment

- Hormone therapy to shrink
- Surgical resection
- Radiation for certain cases

98 Case

- 44 year-old Chinese male reports slow, progressive vision loss over 1 year in both eyes
- Extensive work-up done over 12 months documenting severe vision and visual field loss

99

- Neurology and Ophthalmology

Differential

- ◆ Optic neuritis
- ◆ Infectious Optic neuropathy
- ◆ Autoimmune optic neuropathy

100

- Meds: Biaxin, Ethambutol
- PMH: MAC pneumonia
- No PSH

101

- Va CF OU
- Sluggish pupils, no APD
- NI orbital exam
- IOP, Anterior Segment NI OU

102 Optic Nerves

103 Ethambutol Optic Neuropathy

- Recommended dosage 12.5mg/kg/day to prevent eye disease
- Average dosage 15-20 mg/kg/day

104 Our Patient

- 120 pound male
- 20mg/kg/day
- Slow progressive vision loss.
- Ethambutol stopped p 14 months of use

105 Treatment

- Stop medication; often recovers within 1 year
- Work with pulmonologist
- Use multivitamins with heavy copper and zinc

106 American Thoracic Society

- Guidelines as of July, 2005
- Monthly eye exams (!) while taking ethambutol
- Watch color vision and visual acuity

107 Case

- 52 year-old African-American female here for routine diabetic eye exam.
- PMH: Breast cancer s/p mastectomy
- No medications

108

- Va 20/20 OU
- 2mm pupil OD, 4mm OS
- Dark 3mm OD, 8mm OS
- No APD
- PF: 6 mm OD, 9mm OS

109

110 Lymphedema

111

112

113 Horner's Syndrome

114

115

Differential Diagnoses of Horner's Syndrome

■ **1st order neuron:**

- ◆ Stroke
- ◆ Vertebrobasilar artery insufficiency causing lateral medullary syndrome
- ◆ Multiple sclerosis
- ◆ Syringomyelia

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2nd order neuron (spinal cord, thoracic cavity, and lower neck)

- Severe osteoarthritis of the neck with bony spurs
- Tumor (Pancoast, thyroid adenoma, neurofibroma, metastasis)
- Aortic aneurysm
- Inferior neck trauma or post-surgical damage

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3rd order neuron (upper neck and carotid arterial pathway)

- Cluster headache
- Carotid artery dissection
- Nasopharyngeal tumors
- Cavernous sinus mass (or inflammation, ie. Tolosa-Hunt syndrome)
- Herpes Zoster (HZO)
- Otitis media
- Trauma or post-surgical damage
- Raeder paratrigeminal syndrome

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