The Efferent Visual System: Disorders of Cranial Nerves 3, 4 and 6

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Disclosures

• The presenters have no disclosures affecting the content of this presentation

Third Nerve Palsies

“The Signature” of CN III Paresis

• Hyper deviation which increases in upgaze and reverses in downgaze
• Exo which increases across from the vertically-limited eye

![Image of eye with third nerve palsy]
• 52 y/o man
• Sudden onset painful diplopia
  – Horizontal & vertical
  – Distance & near
Pupil Spared CN III Palsy

- 65 y/o man with diabetes

Aneurysm

86%

14%

Ischemic / Vascular

23%

77%

"Rule of the Pupil"

Aberrant Regeneration of CN III

1. Pseudo-Graefe sign
2. Eyelid synkinesis
3. Light-gaze dissociated pupils

Neuroimaging for CNIII Palsy

• Intra-arterial DSA
• CT Angiography
• MR Angiography

Fourth Nerve Palsies

“The Signature” of CN IV Paresis

• A hypertropia that increases across from the vertically-limited eye and on ipsilateral head tilt
Evaluation of CN IV Palsy

- Which eye is higher in primary gaze?
- Hyper worse in right or left gaze?
- Which eye is higher on head tilt?
- Is there excyclotorsion?
Evaluation of CN IV Palsy

- Which eye is higher in primary gaze?
- Hyper worse in right or left gaze?
- *Which eye is higher on head tilt?*
- Is there excyclotorsion?
Clinical Presentation

- Traumatic CN IV palsy
  - Increased hyper in left gaze & right head tilt

Measuring Excyclotorsion

- Subjective
  - Maddox rod
  - Bagolini striated lenses
- Objective
  - Fundus photos
**Objective vs. Subjective Excyclotorsion**

- Objective = Subjective → Recent onset
- Objective > Subjective → Long-standing
- Objective without subjective → Infantile

**Etiology of Adult Superior Oblique Palsies** *(Mollan SP, et al. Eye 2009)*

- N = 150
- 133 unilateral-isolated:
  - 38% congenital
  - 29% trauma
  - 23% vasculopathic
  - 7% undetermined
- 10 bilateral:
  - 50% trauma
  - 20% tumor
  - 20% undetermined

- 7 unilateral – complicated
  - 71% trauma
  - 14% tumor
  - 14% undetermined

**CNIV: MANAGEMENT?**

- PRISM (base-down over paretic eye/split between both eyes)
  - Rx vertical prism as **NVO!**
- Surgery
  - Wait for spontaneous improvement

**Sixth Nerve Palsies**
"The Signature" of CN VI Paresis

- Eso which increases in the action of the paretic eye

CNVI Palsy
Answer By Motility

- Duction > version
- "Glissades"
- Asymmetric OKN
- Negative forced duction

27 y/o AA Woman

- c/o horizontal diplopia (right gaze > left)
- h/o recurrent headaches (am > pm)
- BVA:
  - 20/20 OD
  - 20/20 OS
S/P Surgical Decompression

40 y/o AA Woman

- Acute diplopia x 2 days
- Horizontal
- Greater at distance and on left gaze
- (+) paraesthesias R > L

Etiology of CN VI Palsy

Mayo Clinic Study of Olmstead Co. MN USA from 1978-1992 (n = 137)

- Undetermined: 26%
- Hypertension: 19%
- HTN & diabetes: 12%
- Trauma: 12%
- MS: 7%
- Neoplasm: 5% (complicated)
- Diabetes (alone): 4%
- CVA: 4%
- s/p neurosurgery: 3%
- Aneurysm: 2% (complicated)
- Other: 8%