Ocular motor and vestibular bedside testing

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Vestibular Bedside Testing

1. Spontaneous Nystagmus
2. Head Impulse Test
3. Skew Deviation
4. Romberg Test on Foam
5. Dynamic Visual Acuity
6. Polyneuropathy
7. Reposition, Reposition, Reposition!

Vestibular Bedside Testing

HINTS

1. Spontaneous Nystagmus

Chronic Downbeat Nystagmus

Help, my vision is jiggling!

Oszillopsia

At rest
With head movement

Downbeat Nystagmus
Bilateral vestibular loss
Cerebellar Atrophy

Acute Upbeat Nystagmus

Pontomesencephalic stroke

Head Shaking Nystagmus

Nystagmus Waveforms
- Constant velocity slow phase (e.g. vestibular nystagmus)
- Decreasing velocity slow phase (e.g. gaze-evoked nystagmus)
- Increasing velocity slow phase (e.g. congenital nystagmus)
- Pendular Nystagmus (e.g. congenital/ acquired)

Investigation is Key
2. Head Impulse Test

Head Impulse Test: Weber et al. Neurology 2008

- Eye Velocity
- Vestibulo-Ocular Reflex
- Normal Subject

Acute Vestibular Syndrome
- Vertigo
- Nausea
- Vomiting
- Peripheral Vestibular Syndrome
  - Vestibular Neuritis
- Central Vestibular Syndrome
  - Cerebellar or Brainstem Stroke

- 100% Sensitivity, 96% Specificity
- More sensitive than early MRI (72%)

9% False Positives (Newman-Toker et al. Neurology 2008)

HINTS?
- HI Head Impulse test
- N Nystagmus
- TS Test of Skew

Nystagmus
- INFARCT!
- Test of Skew

- False Positive
- False Negative

Romberg Test
- Visual
- Proprioceptive
- Vestibular

Fromberg
*Romberg Test on Foam

*Moritz Heinrich Romberg 1795-1873
Fromberg Test

Gentamicin Vestibulotoxicity!

Polyneuropathy

Hepatitis C-associated Polyneuropathy

Encourage walking sticks & good footwear

Dynamic visual acuity DVA

- Head shaking at least 2 Hertz
- Loss of 3 or more lines is indicative of bilateral vestibular loss
Dynamic Visual Acuity Test

96-year old lady

- Short-lasting vertigo when stooping
- Hospitalized after a fall
- Fracture of her pubic bone
- Right posterior BPPV
- Referral for repositioning on our motorized turntable

Outlook et al. 2014. Curing a 96 year old patient afflicted with benign paroxysmal positional vertigo (BPPV) in a motorized chair.

BPPV Epidemiology in the Elderly

- 10% cumulative incidence at 80y
- Up to 9% unrecognized BPPV in geriatric outpatient clinics
- Falls lead, directly or indirectly, to 12% of all deaths in elderly

Cumulative incidence of BPPV

The Foster Maneuver

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Summary

Examination Steps

1. Spontaneous Nystagmus
2. Head Impulse Test
3. Skew Deviation
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HINTS

Diagnosis

- Vestibular
- Visual input
- Proprioception
- Cerebellum
Video Head Impulse Test

Ocular Motor Bedside Testing

Here's looking at you, kid!

6 Classes of Eye Movements

- Stabilizing gaze on the retina (non-volitional)
  - Fixation -> while stationary
  - Vestibulo-ocular reflex -> during self-motion
  - Optokinetic nystagmus -> moving environment
- Directing gaze to a target (volitional)
  - Smooth pursuit -> following a moving target
  - Saccades -> fast gaze shift
  - Vergence -> binocular control

Alternate Cover Test

Head Impulse Test
Optokinetic nystagmus

Impaired smooth pursuit eye movements


Cerebellar Atrophy

Saccadic eye movements

- Fast eye movements for shifting gaze
- Triggered by brainstem nuclei and under cerebellar control
- Disorders of
  - Velocity (slow)
  - Metrics (hypo/hypermetric)
  - Latency (increased)


Slow saccades
spino-cerebellar ataxia type 2
Convergence spasm

Discourage progressive lenses

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Questions?