Common Peripheral Vestibular Disorders

Diagnostic Tools

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Introduction

Dizziness - Etiology

- Vertigo
- Psychiatric
- Disequilibrium
- Presyncope
- Not specific
Common Peripheral Vestibular Disorders – Diagnostic Tools

Introduction

Dizziness - Etiology

Vertigo

Peripheral

Central
The accurate diagnosis of the underlying etiology is an important *first step* in the treatment of vertigo.

Vertigo - Diagnostic Tools

- History
- Physical Exam.
- Audio-Vestibular Tests
- Imaging
Vertigo - Diagnostic Tools

**History**

- True or pseudo vertigo
- One attack or more
- Episodic or continuous
- Duration of each episode
- How starts in first time (*straining, trauma*)

**LISTEN**

- Effect of head movement, life style, environment
- Effect of ear pressure changes
- Associated symptoms
- Associated histories (*medical, family, psychologic*)
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Vertigo - Diagnostic Tools

- Otoscopic Examination (Normal)
- Nystagmus
- Vibration (SSCD, MD, VN)
- Hyperventilation (phobia, demyelination [pressure by AN or vascular])
- Sound/Pressure
- H I T test
- SVV (otolith dysfunction)
- Head shaking
- Positional testing (Hallpike)
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Vertigo - Diagnostic Tools

- **History**
- **Physical Exam.**
- **Audio-Vestibular Tests**

- VNG (saccade, pursuit, nystagmus)
- evaluation as *evoked* in VNG
  - Caloric Test *lower freq.*
  - Head Shaking 1-2 Hz
  - V-HIT 3-5 Hz

- VEMP
- Rotatory Chair
- C D P
- ECOG
- PTA-SRT-WRS, AR
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Vertigo - Diagnostic Tools

- **History**
- **Physical Exam.**
- **Audio-Vestibular Tests**
- **Imaging**

**CT:**
- SSCD Sx.
- LVA Sx.

**MR:**
- Meniere’s Disease
- R/O CP Angle lesions & Other DDx
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**Common Disorders**

- **BPPV**
- **Meniere’s Disease**
- **Vestibular Neuritis**
- **SSCD Sx.**
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Robert Bárány
Austrian Anatomist
1876 - 1936
Benign Positional Peripheral Vertigo

Short episodes of severe vertigo after specific movements of head

- rolling over in bed
- extreme posterior extension of head
  - changing a light bulb
  - looking under a sink
- Turning head to one side (Lt or Rt)

History of

- trauma, Vestibular Neuritis, Meniere’s D., Surgery (Stapes), Bed rest

Dix-Hallpike test + appropriate history
the most important factors for Diagnosis
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Benign Positional Peripheral Vertigo

Differential Diagnoses:

Vestibular Paroxysmia
(Dx Criteria, Carbamazepine responsive)

Differentiate with Clinical Findings (and Paraclinics if needed)

Central causes of Positional Nystagmus

- Demyelinating diseases (MS)
- Cerebellar diseases
- Around 4th Ventricle lesions

Differentiate with Nystagmus specifications
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Prosper Meniere
French Physician
1799 - 1862
Meniere’s Disease

Clinical Triad with special attention to:

- Incapacitating spinning vertigo, usually in the horizontal axis
- Aural fullness as an equivalent to tinnitus
- Life style effect (diet)
- Environmental effect (weather, allergy)
- Positive Family History

- Tumarkin attack (sudden falling without vertigo or consciousness loss)
- Lermoyes feature (unusual improvement of associated symptoms)

Horizontal nystagmus as the cardinal finding (during attacks)

Vibration induced nystagmus
Meniere’s Disease

Caloric test
- *Increased warm & Diminished cold response in affected ear* (DP)

ECoG
- *Amplitude : SP/AP  more than 0.4*
- *Duration : AP more than 3 ms*

Limitations:
- Variability in recording technique
- Variability in electrode placement
- Variability with age
- Not good reproducibility
- Under the effect of hearing loss
- Under the effect of stage of disease
- False positive (20%) & False Negative (40%)
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**Meniere’s Disease**

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**cVEMP**
- Reduced amplitude
- Higher threshold
- Not good response to routine sound frequency
  (1000 Hz is better than 500 Hz)

**Video HIT** is rarely useful

**MRI**
- Axial 3T MRI of the inner ear, 3D Flair,
  4 hours after double dose IV Gd (！)

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History

Physical Exam.

Audio-Vestibular Tests

Imaging
Meniere’s Disease

Differential Diagnoses:

- Vestibular Migraine
  - Diagnostic Criteria
  - Overlap with each other

- Otosyphilis
  - Related History
  - CT and MR findings
  - Extra temporal findings
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Antonio Scarpa
Italian Anatomist
1752 - 1832
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**Vestibular Neuritis**

- Sudden onset of severe vertigo *(days)* + Vegetative symptoms
- Head Thrust (HIT)
- Vibration induced nystagmus
- Audiometry (not new changes)
- Caloric test
- Video HIT
  - used to identify the side of involvement
- VEMP is rarely useful

**Central Mimickers: Brainstem lesions**

*Differentiation by clinical findings*
Superior Semicircular Canal Dehiscence Synd.

Clinical findings:
- Autophony
- Tullio phenomenon (not in all patients)
- Hennebert Sign
- Cough / Strain induced symptoms
- Tinnitus (mostly pulsatile)
- Conductive Hearing Loss (NL middle ear)
- Bizzare symptoms (hearing of eye movement)
- Easy Dizzy

Weber test to the lesion (even from foot !!!!!)

Vibration induced nystagmus

Sound / Pressure / Valsalva induced nystagmus
**Superior Semicircular Canal Dehiscence Synd.**

**Audiometry**
- CHL (Change in Bone threshold) **with** preserved stapedial reflex

**VEMP**
- lower thresholds for response **&** increased amplitude of response
- oVEMP is better than cVEMP **(bone stimulation is better)**

**ECoG**
- May show some abnormalities ?????
Superior Semicircular Canal Dehiscence Synd.

Temporal bone HRCT (bone window, reformatted view)

**History**

**Physical Exam.**

**Audio-Vestibular Tests**

**Imaging**
Superior Semicircular Canal Dehiscence Synd.

**Differential Diagnosis:**

**Perilymph Fistula**

(to endolymph) or (to middle ear)

- **Hx. of trauma, cholesteatoma, ear surgery (may be present)**
- **Hx. from childhood**
- **Direct disease related hearing loss is SNHL**

**History**

- Physical Exam.

**Audio-Vestibular Tests**

- Imaging

- Large Vestibular Aqueduct

- Hyrtl’s fissure
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References

  • Approach to the patient with dizziness
  • Evaluation of the patient with vertigo
  • Pathophysiology, etiology, and differential diagnosis of vertigo
  • Overview of nystagmus
  • Pharmacologic use of glucocorticoids

  • Principles of applied vestibular physiology
  • Evaluation of the patient with dizziness
  • Peripheral vestibular disorders
  • Surgery for vestibular disorders


• Curthoys IS. The Interpretation of Clinical Tests of Peripheral Vestibular Function. Laryngoscope 2012; 122: 1342–52

• ... and some web sources for photos
Thanks a lot for Your Attention

Current presentation content is available at: http://tums.ac.ir/faculties/s-dabiri