

Dizziness and Imbalance

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Lecture Goals

- 1. What do the terms Dizziness, Vertigo, Lightheadedness and Ataxia mean ?
- 2. How common are these disorders ?
- 3. What are the most common causes ?
- 4. How are they diagnosed ?
- 5. How are they treated ?

Definitions

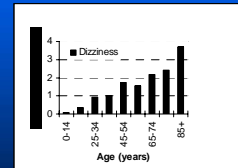
- Vertigo (sensation of motion)
- Ataxia (unsteadiness)
- Lightheaded (faintness)
- Dizziness any or all of the above



Because *dizziness* is an imprecise term, a major role of the clinician is to sort patients out into categories

Dizziness is Common

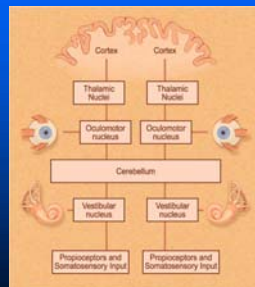
- 30% lifetime chance of dizziness requiring medical attention
- Dizziness increases with age



Estimated percentage of ambulatory care patients in whom dizziness was a primary complaint (Sloane, et. al., 1989).

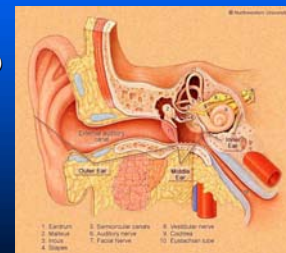
Many Reasons for Dizziness

- Ear (30-50%)
- Nervous system (5-30%)
 - Brain, brainstem
- Medical (5-30%)
- Psychological (15-50%)
- Undiagnosed (15-50%)



Dizziness from the Ear General features

- Vertigo (with nausea) and/or ataxia
- Hearing problems
 - Loss of hearing
 - Tinnitus
- Ear pain or fullness

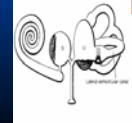


Causes of Dizziness from the Ear

- BPPV (benign paroxysmal positional vertigo) -- about 50%
- Meniere's disease -- 18%
- Vestibular neuritis and related conditions (14%)
- Bilateral vestibular loss (about 5%)

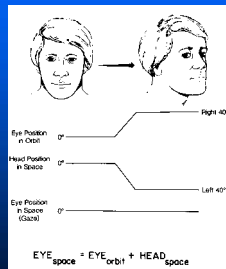
The ear is an inertial navigation device

- Semicircular Canals sense rotation.
- Otoliths (utricle and saccule) sense gravity
- Redundant design.



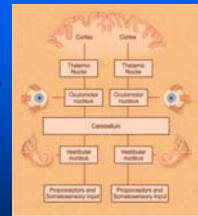
Vestibular Reflexes

- VOR: Vestibulo-ocular reflex – so you can see with your head moving.
- VSR: Vestibulospinal reflex. So you can stand still with your eyes closed.



Positional Vertigo BPPV

- Benign Paroxysmal Positional Vertigo
- Key symptom: Positional Vertigo
 - Bed Spins
 - Dizzy getting out of bed
 - Top shelf vertigo
- Most common cause of vertigo (20%)
- Usual cause of positional symptoms (85%)

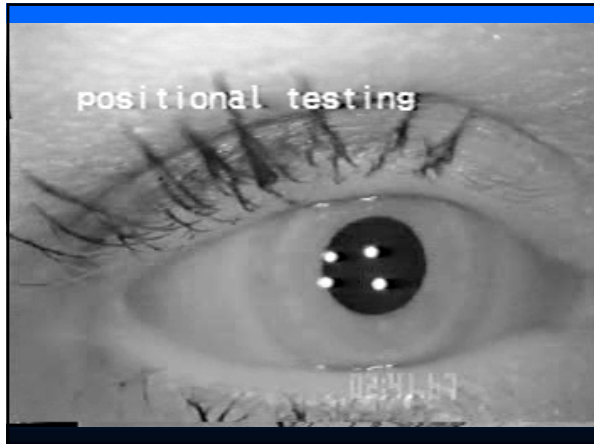


BPPV Case Example

61 Y/O man slipped on wet floor.
LOC for 20 minutes.
In ER, unable to sit up because of dizziness
Hallpike Maneuver: Positive

Positional Vertigo Dix-Hallpike Maneuver





Benign Paroxysmal Positional Vertigo (BPPV)

- 20% of all vertigo
- Brief and strong spinning, some nausea
- Provoked by change of head position
- Diagnosed by Hallpike test
- Good treatment

Mechanism of BPPV

- Otoconia (crystals) are displaced from Utricle
- Symptoms are caused by moving crystals

Canalithiasis – utricular debris migrates to posterior canal

Symptoms are caused by otoconia moving in posterior canal : Treatment is to relocate them

Epley maneuver

Epley Maneuver

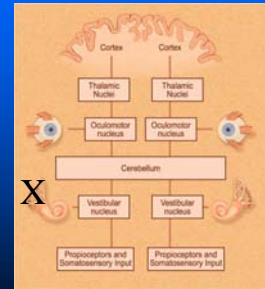
Results of Epley Maneuver

- Most authors report 75% cure from a single treatment, and >95% from repeated treatments.
- The Epley is the treatment of choice for classic BPPV.

Epley JM. The canalith repositioning procedure: For treatment of benign paroxysmal positional vertigo. Otolaryngol Head Neck Surg 1992 Sep;107(3):399-404.

Vestibular Neuritis

- Symptoms: Vertigo, nausea and vomiting
- Viral infection of vestibular nerve or ganglion (herpes).
- No hearing symptoms
- Long duration (2 weeks)



Vestibular Neuritis: Case

56 y/o woman began to become dizzy after lunch. Dizziness increased over hours, and consisted of a spinning “merri-go-round” sensation, combined with unsteadiness.

She began to vomiting 2 hours later and she was brought by family members to the ER.

Vestibular Spontaneous Nystagmus



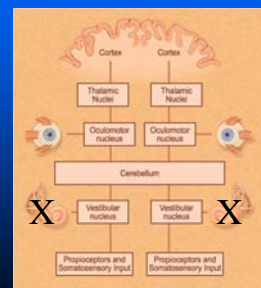
Vestibular Neuritis treatment

- Dizziness typically lasts 2 weeks-2 mo.
- Steroids (New!), Meclizine (antivert) or Diazepam (valium)
- Vestibular Rehabilitation if still symptomatic after 2 months.



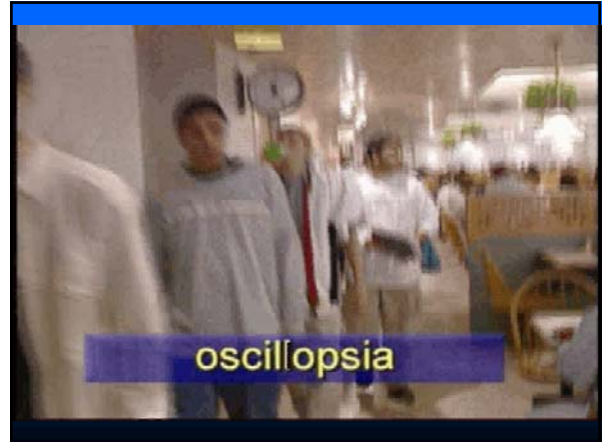
BILATERAL VESTIBULAR LOSS

- Vision moves when one walks
- Unsteadiness



Case: LB

48 YO stewardess with an infected ingrown toenail infection was given a course of antibiotics -- gentamicin and vancomycin. 12 days after starting therapy she developed imbalance. 21 days after starting, she was "staggering like a drunk person". Gentamicin was stopped on day 29. One year later, the patient had persistent imbalance, visual symptoms, and had not returned to work.



Do it yourself test for bilateral loss

- Distance vision with head still
- Distance vision with head moving
- Normal: 0-2 lines change.
- Abnormal: 4-7 lines change



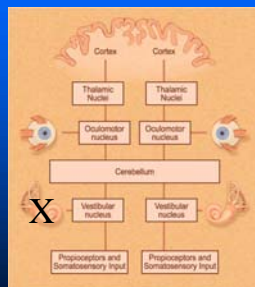
Treatment

- No regeneration in people (birds do it – we are working on getting it to happen in people)
- Physical Therapy



Meniere's Disease

- Symptoms:
 - Episodic vertigo
 - Fluctuating hearing
 - Tinnitus (roaring)
 - Ear fullness



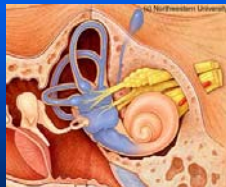
Meniere's Disease

- 1/2000 people in population
- Chronic disorder
- Gradual progression to hearing loss.
- 50% of the time Meniere's eventually affects both ears

Meniere Disease – Endolymphatic Hydrops



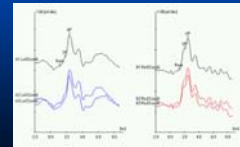
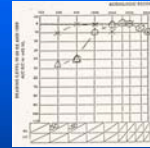
Normal



Swollen (Hydrops)

Diagnosis of Menieres

- Hearing tests – must show reduced hearing
- ECOG – Electrocochleography
 - If abnormal, you have Menieres



Staged Treatment of Menieres

- Salt restriction (2 gram sodium)
- Diuretic (water pill)
- Vestibular suppressants (meclizine, valium and relatives)
- Other medications (verapamil, betahistine)
- **Destructive treatments** →

Gentamicin Treatment for Menieres

- Low dose (new!)
- High dose
- Surgery is rarely used currently.



Gentamicin is an antibiotic that selectively damages the vestibular (dizziness producing) part of the ear. Injections of Gentamicin through the ear drum can often permanently cure the dizziness associated with Meniere's disease. It does not treat hearing loss or tinnitus.

Diagnostic Categories

- Ear (Vertigo or ataxia)
- **Neurological**
- Medical (i.e. low blood pressure)
- Psychological (anxiety)
- Undiagnosed

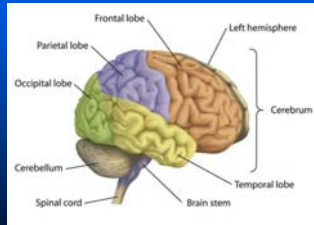
Symptoms of Neurological Dizziness

- Dizziness with headaches (migraine)
- Weakness or numbness
- Double vision/visual loss
- Clumsiness on one side
- Severe unsteadiness



Major Causes of Neurological Dizziness

- Migraine
- Stroke and TIA
- Tumors



Migraine & Vertigo

- Migraine:
 - 10% of U.S. pop†
 - 20-30% of women childbearing age
- Vertigo: 35% of migraine population.*
- Migraine + vertigo:
 - ~ 3.5% of U.S. pop.
 - ~ 10% of women of childbearing age



† Lipton and Stewart 1993; Stewart et al. 1994
 *Kayam/Hood, 1984; Selby/Lance, 1960; Kuritzky, et al. 1981

Diagnosis of migraine associated vertigo

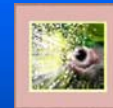
- Headaches and dizziness
- Aura, photophobia, phonophobia, osmophobia
- Lack of alternative explanation
- High index of suspicion in women of childbearing age.
- Family history in 50%
- Response to prevention medication or a triptan



Migraine Aura



"Fortification" Spectra



Treatment of Migraine associated Vertigo is very successful

- Prevention is the key
- Avoid dietary triggers – MSG, alcohol, aged cheese, chocolate
- Daily medications to prevent migraine
 - Verapamil, beta-blockers, anti-convulsants (Topamax -- NEW)



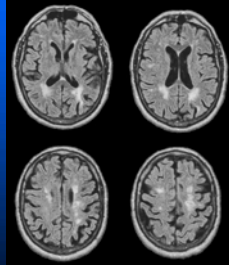
Strokes with Dizziness

- Strokes are an uncommon cause of dizziness
- Small blood vessels in brainstem are usually the cause
- Signs: Sudden dizziness with weakness, numbness, incoordination, visual symptoms



Multi-infarct State (case WC)

- 68 Y/O WM developed episodic vertigo after carotid surgery.
- Vertigo was accompanied by blurred vision.
- Multiple small strokes on MRI



Treatment of Stroke – rehab and prevention

- Physical therapy
- Blood thinners (such as aspirin)
- Control vascular risk factors
 - Weight
 - Blood pressure
 - Exercise
 - Cholesterol
 - Heart disease or Diabetes

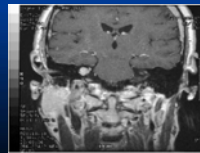


Brain Tumors Causing Dizziness (Very Rare)

- Acoustic Neuroma
- Suspect: dizziness and progressive hearing loss



Diagnosis with MRI
Treatment – surgery or gamma knife radiation (new!)



Diagnostic Categories

- Otological (Vertigo or ataxia)
- Neurological (i.e. posterior fossa)
- **Medical**
- Psychological (anxiety, malingering)
- Undiagnosed

“Medical Dizziness”

- Cardiovascular (23-43%)
 - Low blood pressure
 - Arrhythmia
- Infection (4-40%)
- Medication (7-12%)
- Low blood sugar (4-5%)



Source: Madlon Kay (85), Herr et al (89)

Medical Dizziness Example

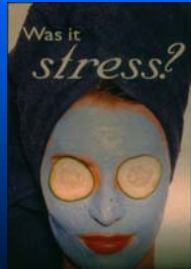
A 65 year old retired fireman, with episodic fainting spells. While mowing the lawn, he would become dizzy, drop to his knees for about 6 seconds, then recover and finish mowing the lawn.

Heart monitoring, done at home, revealed that his heart would stop for about 4 seconds during these spells. He was cured by a pacemaker.



Psychogenic Vertigo

- Anxiety
- Panic



Anxiety

- Long-duration dizziness
- Situational
- Responds to minor tranquilizers and antidepressants
- Some also have vestibular disorders



The problem: Which came first ?

- Dizziness -> anxiety
 - Fear of falling
 - Fear of embarrassment
 - Fear of driving
 - Fear of wide open spaces
- Anxiety -> dizziness
 - Faintness
 - Hyperventilation
 - Fear of open spaces or closed spaces



Panic

- Episodic panic
- Fear, dread, palpitations, dizziness
- Treatment: anti-anxiety medications, antidepressants



Undiagnosed Dizziness

- About 15% of all dizzy patients
- The tests are not 100% sensitive
- We are not perfect either
- Treatment – vigilance, follow up, trials of medications



Summary

- Dizziness is common
- There are many causes: ear, brain, psych, medical problems. Sorting it out can be hard.
- Not everyone can be diagnosed
- Treatments are available for most diagnoses

For more details – see: www.dizziness-and-balance.com

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