Non-otologic Dizziness

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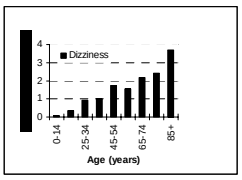
Dizziness is an imprecise term

- Vertigo (sensation of motion)
- Lightheaded
- Ataxia
- Confusion

Because "Dizziness" is an imprecise term, a major role of the clinician is to sort patients

Dizziness is VERY Common

- Dizziness is the chief complaint in 2.5% of all primary care visits.
- 30% lifetime prevalence of dizziness requiring medical attention
- Older people have more dizzy problems



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

Diagnostic Categories

Category	Example
Otological	Meniere's disease
Neurological	Migraine
Medical	Low BP
Psychological	Anxiety
Undiagnosed	Post-traumatic vertigo

Question 1

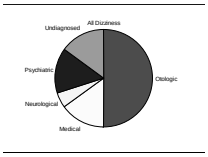
- Which category is associated with the most dizziness ?
  1. Inner ear disorders
  2. CNS problems (e.g. Stroke)
  3. Blood pressure
  4. Psychological problems
  5. Undiagnosed

Answer 1

- It depends on your referral base
  1. Inner ear disorders (about 50% of ENT, 30% in general)
  2. CNS (about 25% of neurology, 5% everyone else)
  3. Blood pressure (30% of family practice, 5% everyone else)
  4. Psychological problems (15% to 50%)
  5. Undiagnosed (up to 50%)

Diagnostic Categories – non-otologic dizziness

1. Neurological (i.e. posterior fossa)
2. Medical (i.e. low blood pressure)
3. Psychological (anxiety, malingering)
4. Undiagnosed



Causes of neurological dizziness 15-30% subspecialty, 5% ER

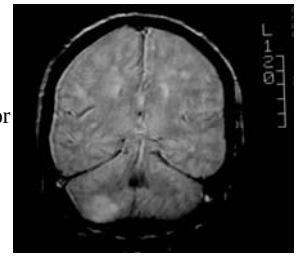
- 35% Stroke and TIA
- 16% Migraine
- Various Ataxias
- Seizures
- Multiple Sclerosis
- Tumors
- Head Trauma
- CSF pressure abnormalities - -CSF leak, NPH

Carotid disease does not cause dizziness

- Carotids supply anterior brain. No dizziness circuitry there. Carotid disease causes weakness/numbness/speech disturbance
- Carotid endarterectomy rarely helps dizziness

Posterior Fossa stroke

- 50 year old OB doctor developed vertigo and unsteadiness
- Continued to operate for a week before seeking medical attention but wife wouldn't let him drive.
- PICA stroke seen on MRI



Common Strokes with Dizziness

- PICA (lateral medullary and cerebellum) – palatal weakness
- AICA (pons and cerebellum) – hearing loss
- SCA (cerebellar)

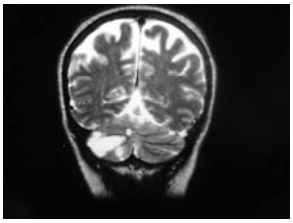
Posterior Inferior Cerebellar Artery (PICA)
Wallenberg's Syndrome
Lateral Medullary Syndrome

- Adolf Wallenberg

German internist, born November 10, 1862, Preuss.-Stargard. died 1949.

Case (IC)

- Onset of dizziness 1 week ago
- Unable to walk
- Diabetes and new onset a-fib
- Exam:
  - Ataxic but intact VOR
  - No spontaneous nystagmus
  - Neuropathy

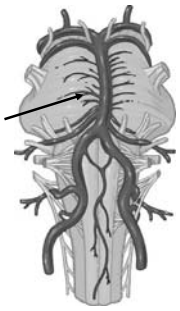


Basilar Artery syndrome (C.A.)

A 44 year old woman was involved in a rear end collision. She had a whiplash injury, and apparently the vertebral arteries in the neck were contused. Several days after the accident she became comatose, and studies suggested complete occlusion of the basilar artery.

Cerebellar infarct

Basilar artery



Basilar artery case findings (1991 vs. 2001)

■ Unsteady Gait	■ Same
■ Finger to nose ataxia	■ Same
■ Nystagmus (eyes moving involuntarily)	■ Same

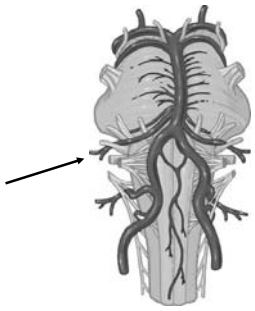
Basilar artery strokes are often fatal.

Common features of cerebellar gait ataxia

- Severe impairment of balance (worse than sensory balance disorders)
- Wide based gait
- Often refractory to treatment and time

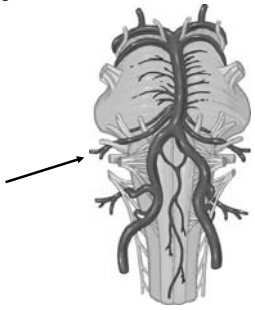
Anterior inferior cerebellar artery Case

- Woman with diabetes, obesity, hypertension suddenly becomes dizzy, and develops facial weakness in swimming pool.
- Brought into hospital and CT scan shows stroke in mid-pons.



Anterior inferior cerebellar artery AICA syndrome

- AICA supplies pons, cerebellum, 8th nerve
- Facial weakness
- Vertigo/hearing loss
- Incoordination



Vascular territory of Anterior Inferior Cerebellar Artery: ICP, Vestibular nuclei, 7th and 8th nerve entry zones

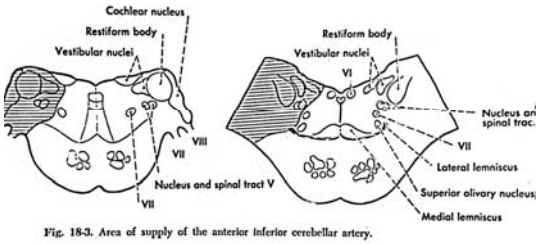
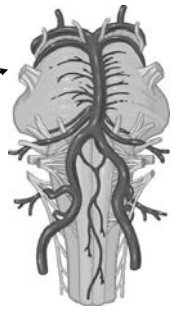


Fig. 18-3. Area of supply of the anterior inferior cerebellar artery.

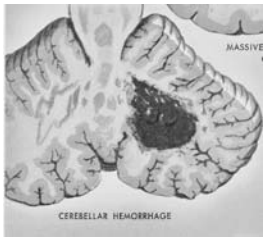
Superior Cerebellar Artery SCA Syndrome

- SCA supplies superior cerebellum and midbrain
- Ataxia and diplopia



Hemorrhagic Cerebellar Stroke

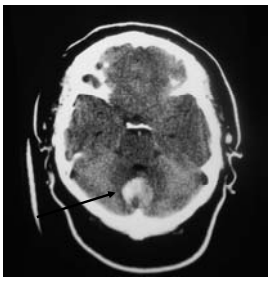
- Signs/Symptoms
  - Ipsilateral or diffuse cerebellar signs
  - Occipital headache
  - Signs of increased ICP
    - » Projectile vomiting
    - » Confusion
- Causes
  - Hypertension, tumors, trauma



(Netter)

Hemorrhagic cerebellar stroke

- Differences from ischemic stroke
  - Much more dangerous
  - Can swell and compress brainstem
  - Surgery is common to decompress



Blood in IV ventricle

Paraneoplastic syndromes -- case

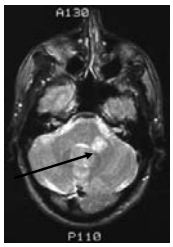
- 35 year old woman admitted to hospital because very unsteady – poor coordination
- Many tests were done without a diagnosis. Nobody did a breast exam.
- 1 year later noticed a large breast lump
- Breast cancer removed – but patient left with severe cerebellar syndrome

Paraneoplastic syndromes

- Remote effect of cancer
- Associated with lung and breast cancer
- Vestibulo-cerebellar syndrome – dominated by
  - Ataxia
  - Nystagmus (particularly downbeating)
- May be related to autoantibodies

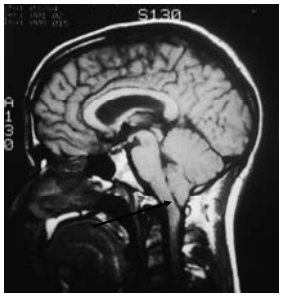
Multiple Sclerosis (MS)

- No single pattern
- Multiple lesions distributed in time and space

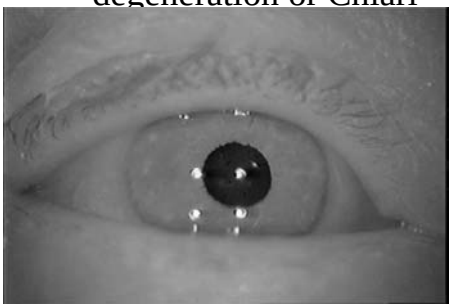


Chiari Malformation: Case

- Dock worker in Baltimore came in because gets dizzy when lifts heavy boxes
- Examination: unsteady, downbeating nystagmus.
- MRI showed cerebellar tonsils lower than normal.

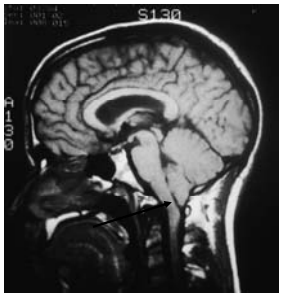


Downbeating Nystagmus may be clue to underlying cerebellar degeneration or Chiari



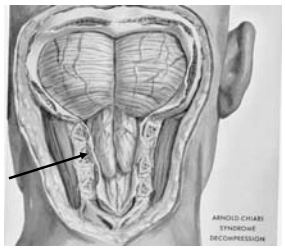
Chiari Malformation

- Cerebellar tonsils herniate downward
- Adult onset
- Straining or coughing produces headache or fainting
- Unsteadiness
- Nystagmus
- Syrinx (hole in spinal cord) often associated
- Platybasia – closely related disorder



Chiari Malformation
Treatment: Suboccipital decompression

Arrow points to tonsils. This surgical exposure is larger than would be used in real operation



Netter

Non-otologic Ataxias – all of neurology ?

- Cerebellar
- Basal Ganglia
- Hydrocephalus
- Sensory loss (B12)
- Periventricular WM lesions
- CSF leak
- Drugs (e.g. anticonvulsants)
- Degenerations (e.g. PSP, Palatal myoclonus)

White matter lesions and dysequilibrium in older people

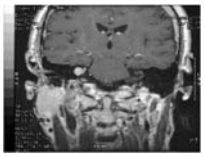
Astrocytotic gliosis was the source of the MRI changes in 3 patients with gait disorder. No infarct or necrosis was found, and not associated with Alzheimer's

Baloh and Vinters, 1995. Postmortem examination of 3 patients with impaired gait thought to be due to subcortical WM lesions on MRI. Arch Neurol 1995:52:975-981.

Brain Tumors Causing Dizziness

We worry a lot about these rare disorders

- Acoustic Neuroma (rare)
- Meningioma
- Cerebellar astrocytoma
- Cerebellar hemangioblastoma

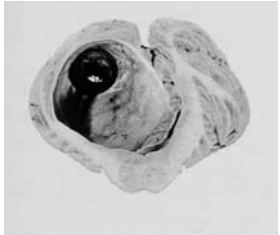


Cerebellar Astrocytoma Case

- Young woman in training at NMH
- Developed a headache and went to ER. In ER a CT scan was done.
- A large tumor was found occupying most of right side of cerebellum.
- Tumor was removed – after operation patient developed incoordination R side. Over 6 months, has improved so much can return to training program.

Cerebellar Astrocytoma

- Largely in children
- Slowly growing tumor
- Cerebellar hemisphere syndromes
- Resection often cures

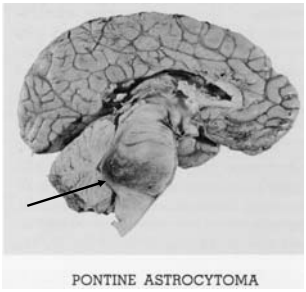


CYSTIC CEREBELLAR ASTROCYTOMA

Rubinstein L, Tumors of the Central Nervous System

Pontine Astrocytoma

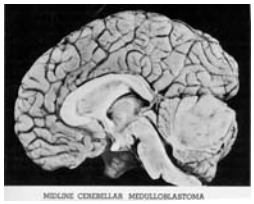
- Largely in children
- Slowly growing tumor
- Affects cerebellar connections
- No treatment – fatal disease



PONTINE ASTROCYTOMA

Rubinstein L, Tumors of the Central Nervous System

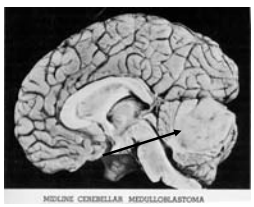
This child is holding onto the bed rail due to ataxia from a medulloblastoma



MIDLINE CEREBELLAR MEDULLOBLASTOMA

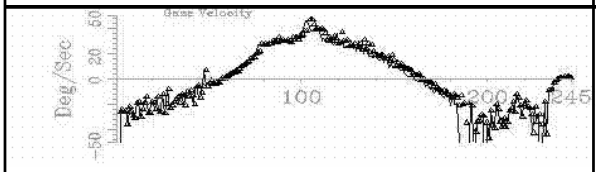
Cerebellar Medulloblastoma

- Mainly affects children
- Begins in cerebellar nodulus -- vestibulocerebellum
- Hydrocephalus (projectile vomiting) and cerebellar signs.
- Treat with resection, chemotherapy and radiation.
- 5 year survival – 80%



MIDLINE CEREBELLAR MEDULLOBLASTOMA

Periodic Alternating Nystagmus (PAN)



Congenital and acquired forms. Acquired form usually from cerebellar nodulus lesion. Usual period is 200 sec.

Treatment of Central Dizziness

- Vestibular Suppressants
- ? Agents that promote compensation
  - Betahistine, Amantadine, Baclofen
- Vestibular rehabilitation
- Environmental adaptations

White matter lesions and dysequilibrium in older people

Astrocytotic gliosis was the source of the MRI changes in 3 patients with gait disorder. No infarct or necrosis was found, and not associated with Alzheimer's

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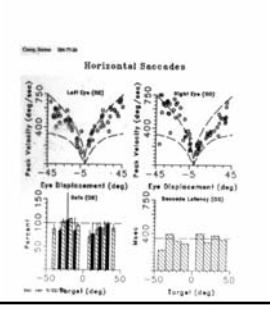
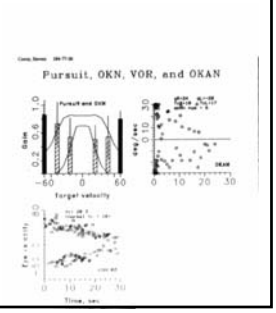
Case

- 8 Year old became dizzy playing video games
- Mother noted the eyes jumped
- Transient confusion

Normal Oculomotor and Vestibular Tests





In the clinic he had a spell of dizziness with clear nystagmus

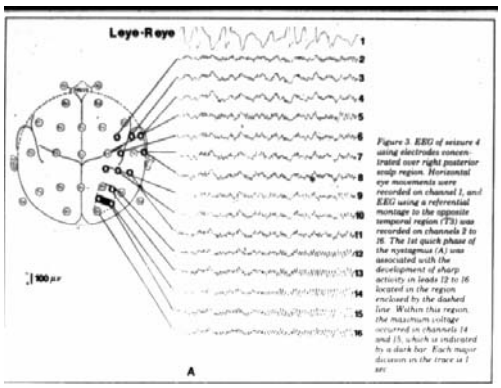


Figure 3. EEG of seizure 4 using electrodes concentrated over right posterior scalp region. Horizontal eye movements were recorded on channel 1, and EEG using a referential montage to the opposite temporal region (T5) was recorded on channels 2 to 16. The 1st quick phase of the nystagmus (A) was associated with the development of sharp activity in leads 12 to 16 located in the region enclosed by the dashed line. Within this region, the maximum voltage occurred on channels 14 and 15, which is indicated by a dark bar. Each major division on the trace is 1 sec.

Seizures causing Dizziness

- Quick spins (1-2 seconds)
  - Also caused by vestibular nerve irritation
- Confusion and dizziness
- May be triggered by flashing lights
- Head injury is common
- Oxcarbamazine may stop them

Migraine & Vertigo: Prevalence

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

† Lipton and Stewart 1993; Stewart et al, 1994

*Kayan/Hood, 1984; Selby/Lance, 1960; Kuritzky, et al, 1981

Diagnosis of MAV
Clinical judgment

- Headaches and dizziness
- Lack of alternative explanation (normal otological exam, neurological exam, CT)
- High index of suspicion in women of childbearing age. Perimenstrual pattern.
- Family history in 50%
- Response to prophylactic medication or a triptan

CSF pressure problems
Orthostatic symptoms

- CSF leak
  - Post-LP dizziness/nausea/headache
  - Post-epidural dizziness/hearing loss/tinnitus
  - Idiopathic

CSF-pressure problems
Normal pressure hydrocephalus

- Ataxic/Apraxic gait
- No vertigo, hearing problems or cerebellar signs
- Respond to spinal tap followed by shunt

Diagnostic Categories

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

"Medical Dizziness" 30% of ER dizzy cases

- Cardiovascular (23-43%)
  - Orthostatic hypotension
  - Arrhythmia
- Infection (4-40%)
- Medication (7-12%)
- Hypoglycemia (4-5%)

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

Psychogenic Vertigo Substantial – perhaps 20%

- Anxiety, hyperventilation, panic, Agoraphobia
- Somatization
- Malingering

Anxiety

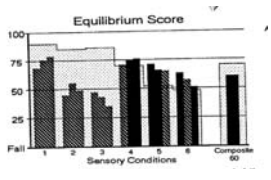
- Long-duration dizziness
- Situational
- Responds to benzodiazepines
- Some have vestibular disorders too

Somatization

- Chronic dizziness
- Numerous bodily ailments
- One goes away to be replaced by another
- We don't have a treatment for SD.
- Do not tell these people there is "nothing wrong". Rather, try to minimize the health-care cost.

We have several good tests for Malingering

- Moving Platform Posturography -- An algorithm for detecting inconsistency (Cevette score)

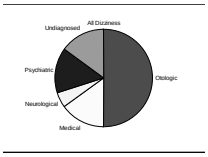


Undiagnosed Dizziness

- About 15% of all dizzy patients
- Our tests are not 100% sensitive
- We are not perfect either

Summary

- Neurological (i.e. Migraine, posterior fossa)
- Medical (i.e. low blood pressure)
- Psychological (anxiety, malingering)
- Undiagnosed



More details

Hain, T.C. Approach to the patient with Dizziness and Vertigo. Practical Neurology (Ed. Biller), 2002. Lippincott-Raven

www.dizziness-and-balance.com