



Vertigo

Presented by Dr. Abdulrahman hagr/ Prof. Abdulrahman Alsanosi

Lecture Objectives:

- ★ Causes of vertigo (acute and chronic labyrinthitis, Meniere's disease, vestibular neuritis, positional vertigo, etc)
- ★ Investigation of a dizzy patient (in short)

Introduction:

What are the balance organs? more than just vestibule

1 Inner ear (3 semicircular canals and otolith organ)

If you have severe symptoms of dizziness this is most probably a problem with the inner ear or cerebellum. vision and proprioception problems rarely cause severe symptoms.

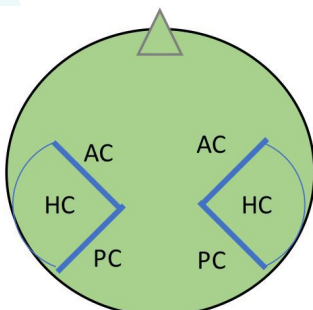
2 Cerebellum

3 Vision (VOR-Vestibulo Ocular reflex): The strongest reflex in our body

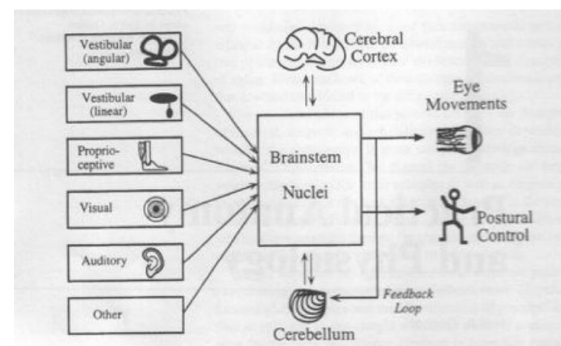
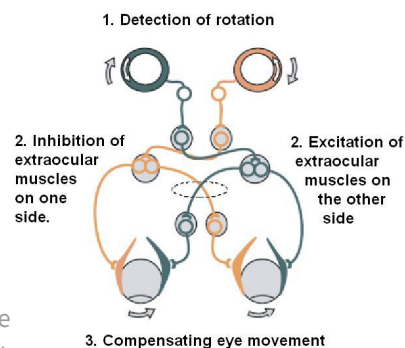
- To stabilize images on the retina during head movement, by moving the eye in direction opposite to the direction of the head, thus keeping image on the center of the visual field. You can test this by performing the finger test: if you move your finger fast and try to follow it with your eyes, the image will not be clear. But if you stabilize your finger and move your head side to side while looking at the finger the finger will be very clear. Why is that? in the first scenario we depend on the eyes to stabilize the finger's image on the retina, but it failed. In the second scenario we are depending on vestibular organ in the inner ear to control the eye movement while head shaking. This is why people with vestibular problems easily get dizzy because there's mismatching between the ear and what they see.
- Posture control
- The anatomical component of VOR are:
 - Semicircular canals
 - Vestibular and oculomotor nuclei in the brainstem
 - Extra-ocular muscles.

4 Proprioception (Muscles Tone & Joints) To know the position of your joints

5 Cerebral cortex



The semicircular canals are paired. We have Horizontal, Anterior, and Posterior (the left and right sides are parallel to each other). They act as sensors to detect any angular movement of the head.



All these inputs (stimulus of an organ) integrate and go to the brain in a systematic way that allows the brain to generate a reflex.

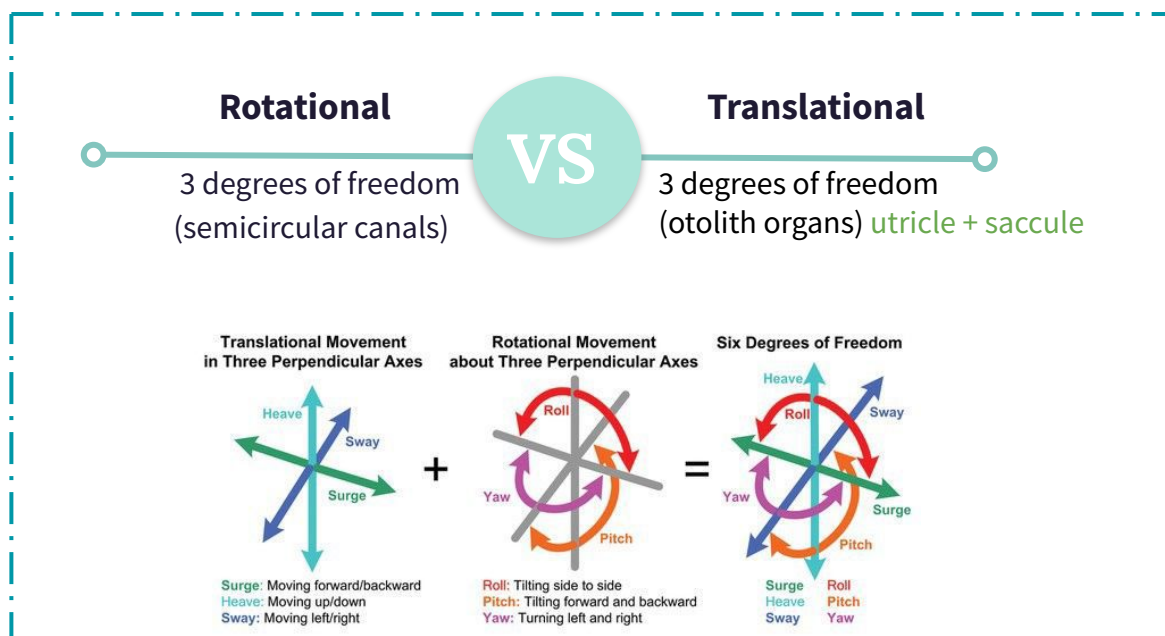
Physiology of balance and function of vestibular system:

- The body's sense of equilibrium is maintained by input from a number of sources. These include the (eyes, proprioceptive organs especially in the muscles and joints of the neck, peripheral nerves, the labyrinth or 'balance organ' in the inner ear which includes the vestibule and semicircular canals and the cerebral cortex and cerebellum).
- Input from all these sources converge in the brain stem; dysfunction of any of these systems may lead to imbalance, a feeling of unsteadiness, 'vertigo' – a sensation of movement – and a tendency to fall.
- Vertigo may be accompanied by 'nystagmus' – a rapid beating of the eyes to one side – as impulses from the brainstem to the ocular muscles attempt to correct the patient's balance.

Vestibular System:

- Head acceleration and gravity (stimulus) → converting into biological signals (from the inner ear to the brain) → brain develops subjective awareness of head position (orientation) → produce motor reflexes that will maintain both posture (contracts and relax certain muscles) and ocular stability (e.g; If someone asks you to concentrate on something and shakes your head, you will keep your eyes focused on the object of interest despite the shaking).
- Semicircular canals are for Angular Acceleration.
- Utricle & Sacculle:
 - Macule of the utricle: plan horizontal.
 - Macule of the sacculle: plan vertical.
 - Linear acceleration horizontal & Vertical (gravity).

Types of Spatial Movement:



- Basic mechanism of detection of rotation:
 - INERTIA
 - Detects head acceleration, but encodes head velocity (i.e. integrator)

What is Dizziness ?

- An illusion of movement of self or environment
- Exact description is important, just dizziness is too vague:
 - True spinning?
 - Lightheadedness?
 - Unsteadiness?
 - Fainting, passing out?

Most ear problems cause vertigo (true spinning), while LOC is not an ENT problem, refer those patients to neurology.

Dizziness is a broad term, every patient with vertigo has dizziness, you can have dizziness without vertigo. So, you need to know what do they mean by “dizziness”, is it true spinning (vertigo) or not.

- **What are the common types of dizziness?**
 - vertigo: the illusion of movement of the self or nearby object.
 - presyncope: lightheadedness or faintness.
 - disequilibrium: unsteadiness of the feet.
 - others: usually a floating sensation.
- **Vertigo:** It is an illusion of rotary moving.
- **Instability:** impossibility to maintain one’s body in desired position. could be caused by low BP and low blood sugar.
- **Nystagmus:** Is an involuntary conjugated rapid repetitive eye movement:
 - Side to side (horizontal)
 - Up and down (vertical)
 - In a circle (torsional)

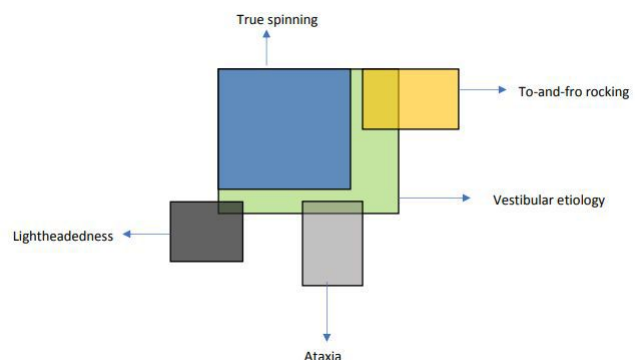
How to approach a patient with vertigo ?

- **Management in 5 minutes:**
 - Vestibular or Non vestibular?
 - Central or Peripheral? (Stroke or Otitis media? Your approach and Rx would be different)
 - Duration of vertigo and auditory system hearing loss (Was it for sec, min, or days? Was it hearing loss or tinnitus or any other symptom?)
 - Proper History(90%) and Physical exam (10%)
 - Treatment

Clue #1: Significance of true spinning

- **Almost all true spinning is vestibular.**
- All vestibular is not true spinning. (vestibular involvement causes vertigo mainly, but it can cause dizziness rarely)

- **Vestibular vertigo features:**
 - Spinning sensation.
 - Nausea and vomiting.
 - Worse with head movement.
 - Ataxia.
 - Nystagmus.

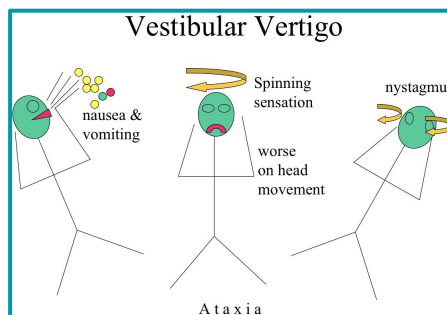


How to approach a patient with vertigo ?

Clue #2: Central vs Peripheral causes

Central

- first think about the life threatening yet treatable causes like CVA before thinking about ENT causes.
- **Neurologic symptoms:**
 - New severe headache
 - LOC (loss of consciousness)
 - Numbness, weakness
- **Type of nystagmus,** nystagmus of central causes are different from peripheral causes.
- **Risk factors** (HTN, DM, if they're on Anticoagulants like warfarin).
- No improvement within 48 hours → increases the risk of central causes like ischemia or stroke of the brain.



Peripheral

- **Examples:**
 - Meniere's
 - BPPV (benign paroxysmal positional vertigo)
 - Vestibular neuritis
- **Ear symptoms.**

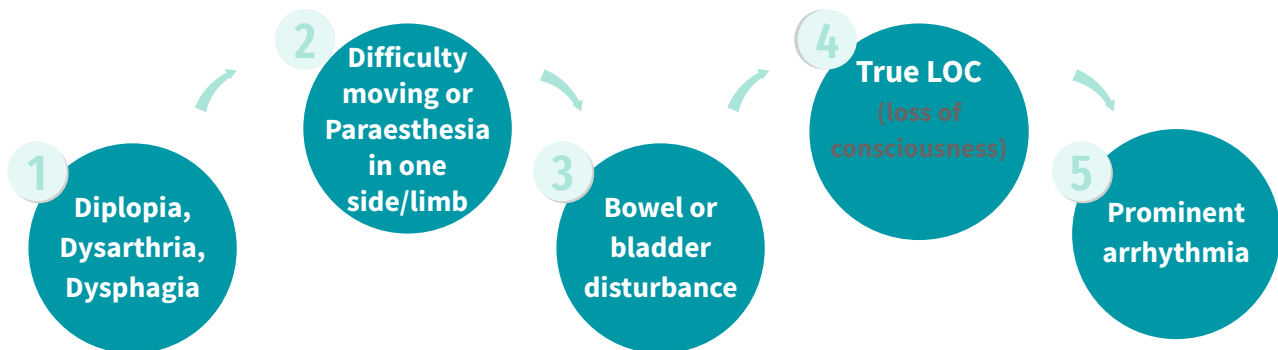
Clue #3: Duration of dizziness

- Otologic: Prime causes
- **Seconds to minutes:** BPPV (position related, repeated episodes, without hearing loss).
- **Minutes to hours:** Meniere's, Recurrent vestibulopathy, Migraine associated vertigo.
- **Days:** Vestibular neuronitis, sudden sensorineural hearing loss with vertigo (labyrinthitis).
- **Constant, no improvement:** never vestibular.

Vertigo duration	With Hearing Loss	Without Hearing Loss
Seconds-Minutes	-----	BPPV usually less than a minute
Minutes-Hours	Meniere's Disease	RV (recurrent vestibulopathy), MAV (migraine associated vertigo) also called vestibular migraine (associated with motion sickness)
Hours-Days	Labyrinthitis (SSHL "sudden sensorineural hearing loss" with vertigo)	Vestibular Neuronitis Lasts for days

How to approach a patient with vertigo ?

Worrisome Features (non vestibular): these features could indicate central causes



Common peripheral clinical diseases (vestibular apparatus + VIII): know the first 3

- **Vestibular neuritis**, Inflammation of vestibular nerve.
- **BPPV** 'Benign Paroxysmal Positional Vertigo'.
- **Meniere's disease**.
- Labyrinthine fistula.
- Superior semicircular canal dehiscence.
- Autoimmune inner ear disease.
- Vestibulopathy.
- Vestibular nerve tumor (vestibular schwannoma).

Can it be more than one type?

- Example ; Vestibular Neuronitis followed by BPPV.
- 1st episode vs most recent episode.
- How often, how long , how changing.



History:

- **history is the most important key to diagnosis for a patient with dizziness**
- The diagnosis of the cause of vertigo or imbalance depends mostly on history, much on examination, and little on investigation.
- Patients will use various terms to describe their imbalance including 'dizziness', 'vertigo', 'funny turns' and 'giddiness'.
- Pay particular attention to timing, i.e. are the symptoms:
 - Constant or episodic
 - Short lived as in the few minutes of dizziness associated with benign positional vertigo
 - Last for a few hours as in Menière's disease
 - Are there associated **ear symptoms**:
 - deafness, tinnitus, earache or discharge, and are there neurological features (loss of consciousness, weakness, numbness, dysarthria and diplopia, or seizures).
 - Note the past medical history and make a record of the patient's medications (ototoxic drug intake: gentamicin and other aminoglycoside antibiotics).

How to approach a patient with vertigo ?



History (cont.):

- What are the questions to ask in history?
 - Frequency: Recurrent, Non -Recurrent.
 - Duration: Seconds, Minutes, Hours to days.
 - Associated auditory symptoms: Tinnitus, Deafness, Fullness
 - Aggravating and relieving factors: Rolling over in bed, getting up from bed, looking up, Consume salty food.
 - Ear disease or ear surgery.
 - Trauma.
 - Migraine.



Examination:

- Complete ENT examination.
- General condition of patient.
- Vital signs, Eye movement (nystagmus).
- Ear examination and Neurological examination including all cranial nerves.
- Hearing test: Tone Audiogram, Speech Audiogram, examining the CN.8.
- Balance test: Romberg , finger to nose test, unterberger test .
- Vestibular examination: Caloric (ENG), swivel chair.

extra

<p>Episodic with ear symptoms</p> <ul style="list-style-type: none"> • Migraine • Menière's disease <p>Episodic without ear symptoms</p> <ul style="list-style-type: none"> • Migraine • Benign paroxysmal positional vertigo • Transient ischaemic attacks • Epilepsy • Cardiac dysrhythmia • Postural hypotension • Cervical spondylosis <p>Constant with ear symptoms</p> <ul style="list-style-type: none"> • Chronic otitis media with labyrinthine fistula • Ototoxicity • Acoustic neuroma <p>Constant without aural symptoms</p> <ul style="list-style-type: none"> • Multiple sclerosis • Intracranial tumour • Cardiovascular disease • Degenerative disorder of the vestibular labyrinth • Hyperventilation • Alcoholism <p>Solitary acute attack with ear symptoms</p> <ul style="list-style-type: none"> • Viral infection, e.g. mumps, herpes zoster • Vascular occlusion • Labyrinthine fistula • Round-window membrane rupture/head injury <p>Solitary acute attack without aural symptoms</p> <ul style="list-style-type: none"> • Acute labyrinthitis • Vasovagal faint • Vestibular neuronitis • Trauma
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Investigation:

- CT: Skull Fracture, tumor?
- **MRI: Of brain, Tumor?**
- Duplex sonography cervicals.
- VNG.
- Audiogram.
- Head impulse test.
- v-HIT.

extra

Symptoms	Peripheral	Central
Imbalance	Moderate-severe	Mild-moderate
Nausea and vomiting	Severe	Variable
Auditory symptoms	Common	Rare
Neurologic symptoms	Rare	Common
Compensation	Rapid	Slow

Disorders of vestibular system cause vertigo and are divided into:

Peripheral Vestibular loss:

Examples (will be discussed in details)

- 1-Vestibular neuritis
- 2-BPPV (benign paroxysmal positional vertigo)
- 3-Meniere's disease

Involve vestibular end organs and their 1st order neurons (i.e. the vestibular nerve). The cause lies in the internal ear or the VIIIth nerve. They are responsible for 85% of all cases of vertigo.

Central Vestibular loss:

Involve central nervous system after the entrance of vestibular nerve in the brainstem and involve vestibulo-ocular, vestibulospinal and other central nervous system pathways.

Examples: 1- cerebrovascular accident 2- Acoustic neuroma: has been associated with exposure to loud noise and music (If there is any neurological symptoms never call an ENT consultant).

Peripheral vestibular loss:

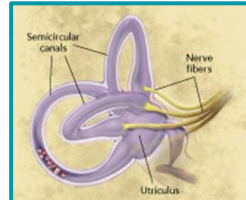
1 BPPV (benign paroxysmal positional vertigo):

In short; Crystals or Particles enter the SC canals by mistake and cause dizziness

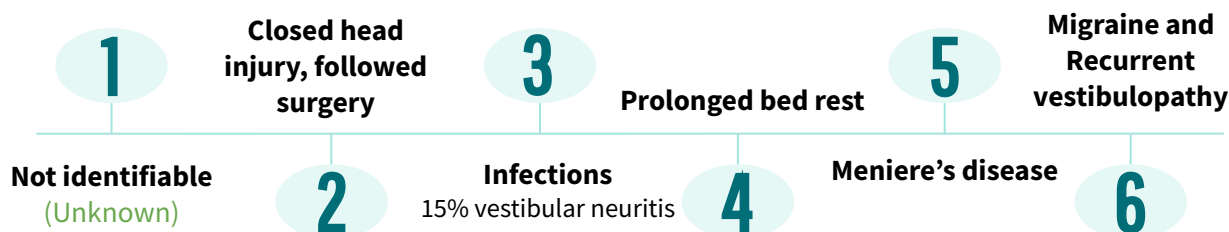
- Most common cause of peripheral vertigo in patients over 40

Pathophysiology:

- Canalithiasis theory: degenerative debris from utricle (otoconia) → floating freely in the endolymph. migration of free floating otoliths within the endolymph of the semicircular canal.
- Cupulolithiasis theory: Debris adhering to the cupula. otolith attached to the cupula of the semicircular canal, can affect each of the 3 semicircular canals, although the posterior canal is affected in >90%.
- Ear stones “otoliths”, posterior semicircular canal is the most common canal affected. In the examination we test the canal by moving the head down and see if there’s nystagmus.
- Posterior canal: hangs down like the water trap in drain pipe, allowing the crystals to settle in the bottom of the canal.



Etiology:



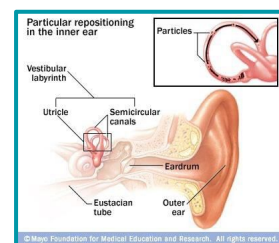
Approach:



History (virtually pathognomonic):

almost pathognomonic once you hear this classical history there is no other differential


- Severe vertigo.
- Associated with change in head position:
 - rolling over or getting into bed.
 - assuming a supine position.
 - arising from a bending position.
 - looking up to take an object off a shelf.
 - Tilting the head back to shave.
- Provoked by certain positions (rolling in bed, looking up for shaving and head rotation).
- Suddenly and last in the order of seconds.
- Bouts of vertigo → remissions.
- Chronic balance problems.
- Worse on awakening in the morning.
- Only type of vertigo:
 - multiple times a day repeated attacks episodic.
 - brief episodes (seconds) should count them, less than 1 minute.
 - unaccompanied by auditory complaints, no tinnitus, hearing loss, discharge, or earache and no neurological symptoms.

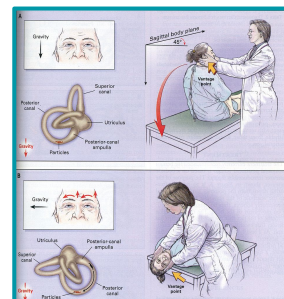
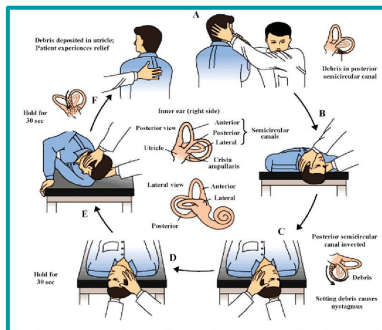


Peripheral vestibular loss:



Examination (to confirm the diagnosis):

- **Dix hallpike maneuver** 
- Dix hallpike maneuver (Hager 6Ds):
 - 1) Delay (seconds latency).
 - 2) Downward (geotropic).
 - 3) Duration (less than 1 min).
 - 4) Directional changes.
 - 5) Dizziness (Subjective).
 - 6) Disappear (fatigable).
- Five Signs of BPPV Seen with Dix Hallpike Maneuver: “You’re removing the particles back to where they came from”
 - Geotropic rotatory nystagmus (nystagmus MUST be present for a positive test)
 - Fatigues with repeated maneuver and fixation.
 - Reversal of nystagmus upon sitting up.
 - Latency of ~20 s
 - Crescendo/decrescendo vertigo lasting 20 s.
- Nystagmus will be seen but repeated testing results in abolition (canceling) of the vertigo.
- Nystagmus in BPPV:
 - The nystagmus is a combined vertical upbeating and rotary (torsional) component beating toward the downward eye.
 - There is often a latency of onset of nystagmus (seconds).
 - Duration of nystagmus is short (<1 minute).
 - The nystagmus disappears with repeated testing (fatigable)




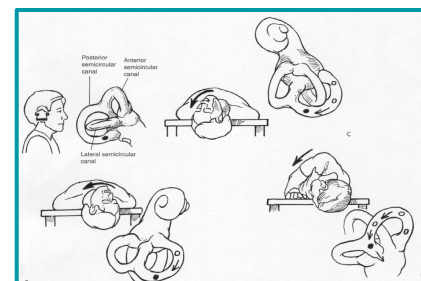
Differential diagnosis:

- Postural hypotension (anti-hypertensive drugs / CV problems)
- Fistula



Treatment:

- Aim of the treatment is to move the debris (otoconia) out of the affected semicircular canal back into the vestibule.
- Anti-emetics for nausea/vomiting.
- Particle repositioning maneuvers: **Epley maneuver** 



Basically, pt will be in laying down position with head rotated to the affected side, he/she will feel vertigo and the physician will be able to notice nystagmus which is the typical diagnostic feature (**Dix hallpike maneuver**). After vertigo and nystagmus subsided, turn the head to the other side 90° and wait for 30 sec then rotate the whole body 90° for 30 sec and the particle will move out when the pt set up (Epley maneuver).

Peripheral vestibular loss:

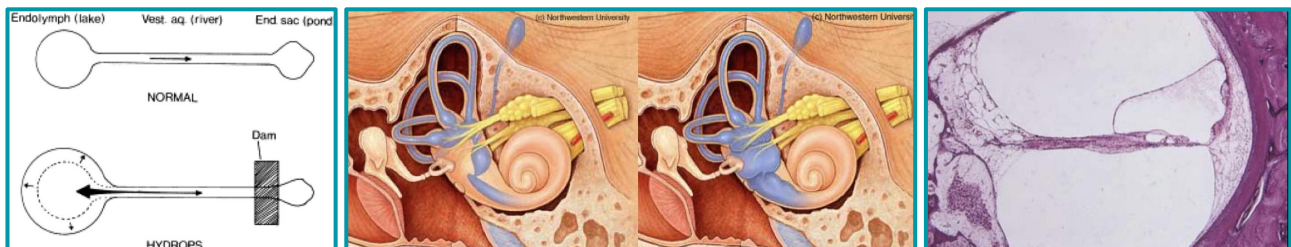
2 Meniere's disease:

Definition

- Recurrent attacks of vertigo lasting hours. Associated tinnitus, hearing loss, pressure.
- Can occur at any age but its onset is common between 40-60 years. مرض المساهير

Pathology:

- Normally, endolymph is secreted by stria vascularis, fills the membranous labyrinth and is absorbed through the endolymphatic sac.
- Decrease endolymphatic reabsorption or increase production of fluid within inner ear or decrease absorption.
- Progressive hydrops.
- Membranous ruptures.
- Spillage of large amount of neurotoxic endolymph into the perilymphatic compartment.
- Healing of the membranes.
- Distortion and atrophy of sensory and neural structures.
- Autopsies revealed scala media is hyperinflated > ruptures.
- In 10-20% of cases the disease later involves the opposite ear.



Causes:

- It's due to a disease of the inner ear that causes an increase in pressure in the inner ear canal. Overproduction or retention of endolymph (Unknown, autoimmune, ischemia, mumps, syphilis, hypothyroidism, head trauma, previous infection, hormonal (pregnant females are more prone)).

Triggers:

- High salt intake, caffeine, stress, nicotine and alcohol. Males affected more than females.

Diseases course:

- Early: predominant vertigo, deafness (partial), normal hearing between (the attacks).
- Later: hearing loss stops fluctuating, progressively worse (50db). Inner ear lost function of hearing and balance.

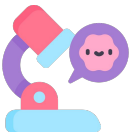
Peripheral vestibular loss:

2 Meniere's disease(Cont):



Symptoms:

1. **Vertigo:** usually spinning sensation lasts 20 minutes - 5 hours, accompanied by nausea and vomiting with ataxia and nystagmus towards the unaffected ear.
2. **Fluctuating SNHL 'deafness':** improves after the attack. Low frequency fluctuating SNHL - Although deafness is fluctuant repeated attacks can cause significant sensorineural hearing loss.
3. **Tinnitus:** usually low-tone roaring.
4. **Aural fullness:** it also happens before the onset of the attack. Due to increased hydraulic pressure within the inner ear endolymphatic system.



Diagnosis:

1. **History:** *pathognomonic symptoms*
 - Recurrent attack of vertigo for minutes to hours.
 - Associated with tinnitus, fluctuating hearing loss. (vs BPPV)
 - Aural (ear) fullness (unlike vestibular neuritis).
 - Sudden severe attacks may be accompanied by other symptoms of vagal disturbances such as abdominal cramps, diarrhea, cold sweats, pallor and bradycardia.
2. Physical exam:
 - Will not really help you: unilateral hearing weakness.
3. PTA(pure tone audiometry):
 - LF-SNHL (low frequency sensorineural hearing loss).
4. You must rule out other possible diagnosis by CT or MRI to rule out acoustic neuroma for example.



Management:

- Education.
- Treat the acute attacks (stay away from dangerous places, prevent falls).
- Prevent further attacks.
- Improve hearing.
- Vestibular rehabilitation.
- Follow up bilateral Meniere's disease.
- Medical (anticholinergic, antihistamine, phenothiazine, benzodiazepines).
- We may put ototoxic drugs like **gentamicin** to destroy and poison the damaged ear.(First line)
- Surgical (we destroy the inner ear ; drill cochlea and nerve).(second line)
- Acute attack: prevent falls, head should be restricted, anticholinergics, antihistamines, phenothiazine, benzodiazepines, bed rest, vestibular sedatives (dimenhydrinate, promethazine theoclate or prochlorperazine), vasodilators.
 - Chronic phase: Vestibular sedatives, vasodilators, diuretics, elimination of allergen, hormones (in case of hypothyroidism).
 - Decrease intake of CATS (chocolate, alcohol, tea, salt), cessation of smoking, avoid stress.

Peripheral vestibular loss:

3 Vestibular neuritis:

(labyrinthitis: a similar syndrome, but with hearing symptoms)

- Disorder that affects the vestibulocochlear nerve of the inner ear.
- 50% may have upper respiratory tract infections.
- 50% infectious illness precede VN (viral infection of vestibular organ) URTI.
- Affect all ages but rare in children.
- Abrupt onset.
- Single, severe, prolonged, spontaneous vertigo, nausea, vomiting and Nystagmus.
- No hearing loss, or severe vertigo: imbalance without hearing loss that resolves over days leaving the residual imbalance that last days to weeks. Patient is fully awake.
- No neurological signs/symptoms.
- Treatment: symptomatic (3 weeks to recover), spontaneous recovery occurs over weeks to months.
- Neurological origin (stroke), should be eliminated.

Clinical Features:

- Acute phase: severe vertigo (vertigo could turn into instability) with nausea, vomiting, and imbalance lasting 1 to 5 d, Irritative nystagmus (fast phase towards the offending ear) patient tends to veer towards affected side.
- Convalescent phase: imbalance and motion sickness lasting days to weeks, Spontaneous nystagmus away from affected side, gradual vestibular adaptation requires weeks to months.

Investigation



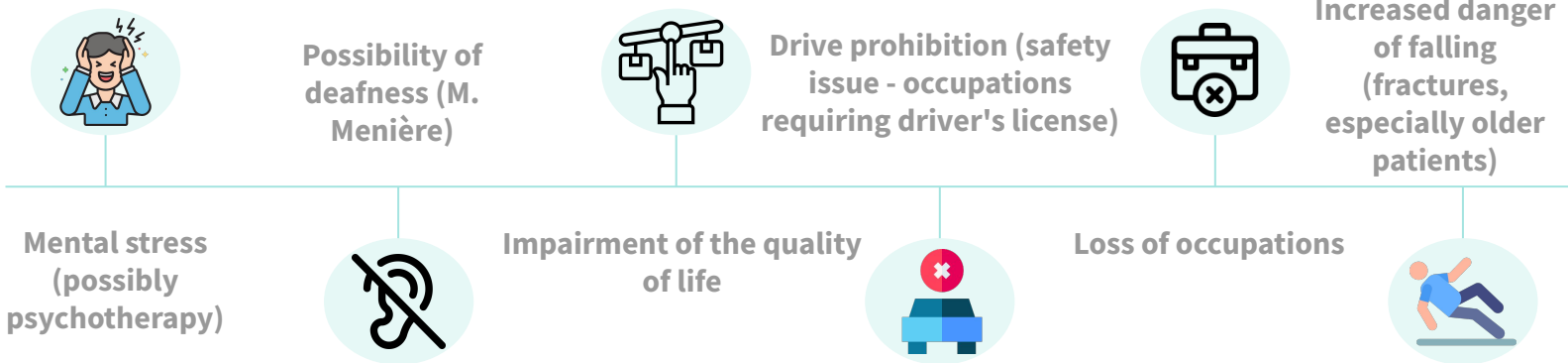
- Audiogram
- Videonystagmography
- v-HIT
- CT Scan
- MRI

Treatment



- Usually self-limiting.
- The patient requires only symptomatic treatment.
- Acute phase: bed rest, vestibular sedatives (Gravol®), and diazepam.
- Convalescent phase: progressive ambulation especially in the elderly, vestibular exercise: (involve eye and head movements, sitting, standing, and walking).

Vertigo consequences:



Ototoxicity:

- Usually aminoglycosides or chemotherapy **both ears; bilaterally.**
- Complain of oscillopsia.

Investigation:

For any patient with dizziness. 99% of the diagnosis depends on the history and examination. But we do investigations to have a baseline.

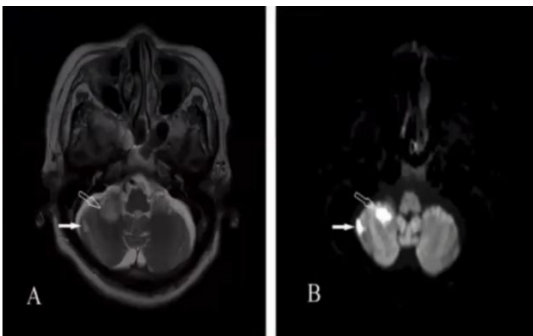
- Audiology tests **are routinely done** for any dizzy patients, and will be discussed in audiology.
 - PTA (pure tone audiometry).
 - ENG (Electronystagmography).
 - Posturography.
 - Rotation chair.
- Radiology
 - CT/MRI (if we suspect a brain tumor).
- Blood tests (for other diseases)
 - CBC, thyroid, FT-ABS.

An area for your notes

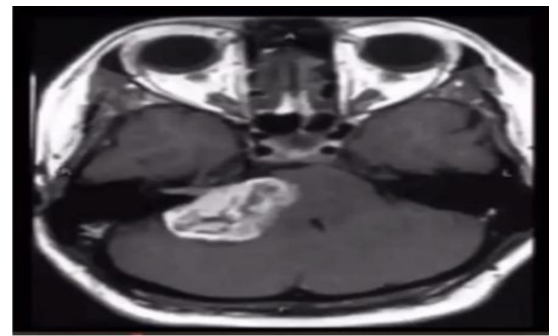
Central etiology

Part of obj

- Vascular insufficiency e.g; stroke.
- Mass lesion e.g; CPA tumor, acoustic neuroma.
- Multiple sclerosis.
- Epilepsy.
- Arnold-chiari malformation.
- Migraine induced vertigo:
 - Very common in female.
 - Commonly occur below age of 30.
 - Hx of true attacks of migraine with/without vertigo and vice versa or pt present with vertigo only with previous Hx migraine.
 - Diagnosis based on Hx.



Both pictures of MRI indicate stroke.
A: without contrast.
B: with contrast.



- Acoustic neuroma at the right side.
- **Acoustic neuroma:**
 - Pt present similarly like Ménière's disease.
 - Clinical presentation of acoustic neuroma :
 - Tinnitus.
 - Continuous and progressive hearing loss unlike Ménière's disease which is **fluctuating**.
 - Persistent vertigo common on daily bases, while Ménière's disease comes and goes.

Central etiology

Part of obj

1- Acoustic neuroma:

- Benign tumor, arise from vestibular division of VIII.
- Pathogenesis:
 - Starts in the internal auditory canal and expands into cerebellopontine angle (CPA), compressing cerebellum and brainstem
 - When associated with type 2 neurofibromatosis (NF2): bilateral acoustic neuromas, café-au-lait skin lesions, and multiple intracranial lesions
- Clinical presentation:
 - Unilateral tinnitus
 - Hearing loss
 - Dizziness But true vertigo is rare as tumor growth is slow thus compensation occurs.
 - Facial nerve palsy and trigeminal (V1) sensory deficit (corneal reflex) are late complication.
- DDX:
 - Acoustic neuroma mimics Meniere's disease in presentation and imaging is the only way to differentiate between them.
- Diagnosis:
 - History
 - PTA (Unilateral SNHL)
 - Radiology (CT, MRI)
 - MRI with Gadolinium contrast is the gold standard.
- Treatment:
 - Expectant management if tumor is very small, or in elderly. Definitive management is surgical excision.

2- CVA:

Elderly patient with chronic disease like (DM, HTN) with sudden attack of vertigo + neurological symptoms. Vertigo is abrupt in onset, lasts several minutes and is associated with nausea and vomiting. Other neurological symptoms like visual disturbances, drop attacks, diplopia, hemianopia, dysphagia and hemiparesis resulting from ischaemia to other areas of brain may also accompany vertigo.

An area for your notes

A dizzy patient may fit into one of the following scenario:

1- The patient who is having a first ever attack of acute spontaneous vertigo.

- DDX:
 - Acute vestibular neuritis
 - Cerebellar infarction (stroke)
- How to differentiate?
 - Clinically if still not sure go for imaging
 - Radiology

2- The patient who has repeated attacks of vertigo, but is seen meanwhile well (means between attacks he is fine)

- DDX:
 - Benign paroxysmal positional vertigo *
 - Ménière's disease *
 - *To differentiate between these two above, look for 3 things: (1) vertigo duration, (2) positionally related or not (3) hearing loss.
 - Migraine induced vertigo common attack that comes and goes and pt will tell you a specific details about his/her migraine attacks.
 - perilymph fistula is a communication between middle ear and inner ear by fistula induced surgically or pathologically by a disease, those patients have vertigo attacks that comes and goes which are mostly provoked by straining and lifting heavy objects.

3- The patient who is off balance day and night I'm feeling imbalanced, so it's not recurrent and it's not one attack.

- DDX:
 - Bilateral vestibulopathy due to autoimmune diseases or ototoxic medications
 - Normal pressure hydrocephalus
 - Posterior fossa tumor

Conclusion:

- Proper history is the most important key for diagnosis of a dizzy patient.
- If you can't reach a diagnosis from the first visit don't feel disappointed, try to bring patient back for another assessment.
- A multi specialty (Cardiac, Optha, Psych) approach is sometimes appropriate for some complicated cases.
- Investigations should be tailored to the most likely diagnosis. Don't do unnecessary tests when they're not needed

Case Scenarios 436:

Case 1

- 50-year-old patient, medically free
- Sudden dizziness with head movement 3 days ago
- Horizontal Nystagmus to the left
- No problems without Head movement
- Accompanying symptoms (nausea, vomitus)
- No hearing problems, no tinnitus
- Answer: benign paroxysmal positional vertigo

Case Scenarios 436:

Case 2

- 32-year-old female patient with recurrent episodes of vertigo
- Relapsing accompanying hearing loss, tinnitus
- Frequently nausea / vomiting
- Fall inclination both sides
- Persistent hearing loss in the interval (weeks)
- Recurrent inflammation of both eyes
- Answer: **cogan syndrome**

Questions 436:

1. Young female complaining of acute persistent vertical vertigo no hearing loss no tinnitus no fullness, but she reported a history of respiratory infection last week. what is the diagnosis?
 - A. BPPV
 - B. Vestibular neuritis
 - C. Meniere's disease
2. A 60-year-old man, complaining of severe tinnitus, episode of vertigo, and hearing loss in his right ear. PTA showed SNHL in the right ear, while the left was normal. What are the suspected finding in tuning fork test in this patient?
 - A. Weber test is lateralized to the right, Rennes test is negative
 - B. Weber test is lateralized to the left, Rennes test is positive.
 - C. Weber test is central, Rinne test is negative.
 - D. Weber test is central, Rinne test is positive.
3. A patient presented with history of hearing loss and vertigo. Pure tone audiometry showed SN hearing loss. ABR(auditory brainstem response) showed abnormal waves. What is the diagnosis?
 - A. Vestibulitis
 - B. Acoustic neuroma
 - C. Meniere disease
 - D. BPPV (Benign Paroxysmal Positional Vertigo)
4. 28-year-old female presented with vertigo which last for minutes with hearing loss and tinnitus. What is most likely the diagnosis?
 - A. Benign paroxysmal positional vertigo
 - B. Vestibular neuritis
 - C. Meniere's disease
 - D. Acoustic neuroma
5. 26 years old female comes with 6 days history of severe vertigo associated with right sided hearing loss. She had a history of chronic suppurative otitis media for many years. On examination there is marginal moist perforation on the right ear drum. There is horizontal nystagmus. What is the most likely cause of vertigo?
 - A. Acute labyrinthitis
 - B. Benign paroxysmal positional vertigo.
 - C. Meniere's disease
 - D. Vestibular neuritis

THANK YOU!

This work was done by:

Abdullah Aljammaz
Ibrahim Alshaqrawi

Reviewed by:

Tariq Alanezi
Lama Alzamil

Team Leader:

Mohammed Alhamad

