

## Vertigo

**Sources:** Lecture notes, slides, Toronto's notes

### History is very Important

#### Evaluation of the Dizzy Patient:

- Vertigo: Illusion of Rotational, Linear, or tilting movement of self or Environment.
- Vertigo is produced by Peripheral ( Inner Ear) or Central ( brain stem-cerebellum ) stimulation
- It is Important to distinguish Vertigo from other disease entities that may present with similar complaints of Dizziness ( e.g: CVS, Neurological .. etc)

#### Peripheral Vs. Central Vertigo

Symptoms	Peripheral	Central
Imbalance	Mild- Moderate	Severe
Nausea and Vomiting	Severe	Variable
Auditory Symptoms	Common	Rare
Neurological Symptoms	Rare	Common
Compensation	Rapid	Slow
Nystagmus	UNI directional ( Horizontal or Rotatory )	Bi directional ( Horizontal or Vertical )

#### Differential Diagnosis of Vertigo Based on History

Condition	Duration	Hearing Loss	Tinnitus	Aural Fullness	Other Features
BPPV	Seconds	-	-	-	-
Meniere's Disease	Minutes to Hours	Uni/Bi lateral Fluctuating	+	Pressure/ Warmth	-
Vestibular Neuritis	Hours to Days	Unilateral	-	-	-
Labyrinthitis	Days	Unilateral	Whistling	-	Recent AOM
Acoustic Neuroma	Chronic	Progressive	+	-	Ataxia CN VII Palsy

## DISORDERS OF VESTIBULAR SYSTEM

### **CAUSES:**

#### **1. Peripheral:**

- 85 % of cases
- Vestibular organ i.e. inner ear + vestibular n

#### **2. Central --> CNS**

### **Peripheral explanation**

#### **a. Benign Paroxysmal Positional Vertigo:**

- Vertigo when face is place in certain position
- Disorder mainly in semicircular canal
- Precipitated by head traumas & ear infection
- Approach by History & positional test
- Diagnosis by Epley's manomey (see book C))
- 80% of pt. cured by single maneuver

#### **b. Vestibular neuritis:**

- Sudden Severe vertigo
- Lasts from few days to several weeks
- Diagnose as meniere's disease for acute attack
- Usually it's self limited

#### **c. Polynthitis**

#### **d. Head trauma**

#### **f. Syphilis**

#### **g. Acoustic Neuroma**

#### **h. Minere's disease.**

### **What are the components of balance system ?**

1. Inner ear ( 3 semicircular canals: one lateral one vertical one posterior ( Why? ) any movement to be detected to the brain through them )
2. otolith organ: control back and forth and side to side movement )
3. Cerebellum
4. Vision (VOR)
5. Proprioceptive

## How does balance system work ?

### Physiology:

#### Function of vestibular system:

1. Transform of the forces associate with head acceleration and gravity into a biological signals that the brain can use to develop subjective awareness of head position in space (orientation)
2. produce motor reflexes that will maintain posture and ocular stability

### **It is not surprisingly that vestibular lesion cause:**

- Imbalance
- posture and gait imbalance
- visual distortion (oscillopsia ). Like Truck Drivers !



This is how the patient with loss of eye control present with.

He feels like the pupil is going up and down with head movement

- The word "vertigo" comes from the Latin "vertere", to turn + the suffix "-igo", a condition = a condition of turning about).
- **Vertigo is: Illusion of Rotational, Liner, or tilting movement of self or Environment.**

### **What are the questions to ask in history ?**

1. Onset
2. Frequency
3. Duration
4. Associated auditory symptoms
5. Aggravating and relieving factors
6. Ear disease or ear surgery
7. Trauma
8. Migraine
9. Ototoxic drug intake

### **Differential diagnosis**

1. peripheral vestibular loss : from vestibular nerve Nuclei down to the cochlea ( Inner Ear)
2. central vestibular loss : anything above Vestibular Nuclei.

### **What are the causes of peripheral vestibular loss ?**

1. Vestibular neuritis
2. Benign paroxysmal positional vertigo ( BPPV)
3. Meneires disease (Endolymphatic hydrop )

## **1. Vestibular neuritis**

### **Definition:**

Acute Onset of disabling vertigo often accompanied by Nausea, Vomiting and Imbalance without Hearing Loss That resolves over days leaving a residual Imbalance that lasts days to weeks.

### **Etiology:**

- Viral infection of vestibular organ ( e.g. Measles, Mumps, Herpes Zoster )
- Affect all ages but rare in children.
- Affected patient presents acutely with spontaneous nystagmous ,vertigo and nausea &vomiting
- Patient requires only symptomatic treatment
- It takes 3 weeks to recover from vestibular neuritis

### **Clinical Features:**

#### **1. Acute Phase:**

- Severe Vertigo with Nausea, Vomiting and Imbalance lasting 1 to 5 days
- Irritative Nystagmus ( Fast towards the offending ear)
- Patient tends to veer Towards affected side

#### **2. Convalescent Phase:**

- Imbalance and motion sickness lasting days
- Spontaneous Nystagmus away from Affected side !

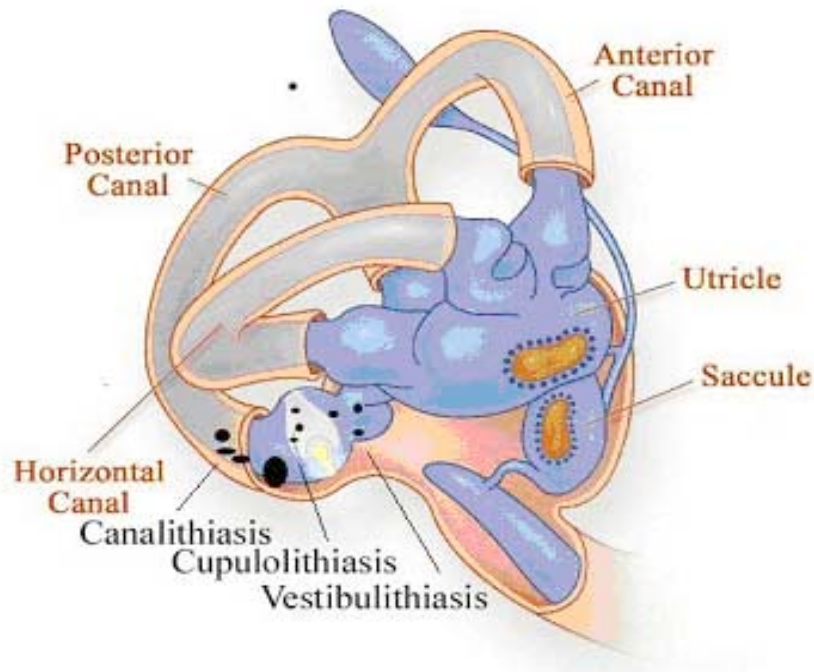
#### **3. Incomplete recovery likely with the following Risk Factors: elderly**

#### **4. Repeated attacks can occur**

### **Treatment:**

1. **Acute phase:** Bed rest, Vestibular Sedatives ( Gravol ) , diazepam
2. **Convalescent phase:** Progressive Ambulation, Vestibular Exercise ( Involve eye and head movement.

## 2. Benign paroxysmal positional vertigo ( BPPV)



### Definition:

- Acute Attacks of Transient Vertigo lasting seconds to Minutes Initiated by Certain head positions accompanied by rotatory Nystagmus ( geotropic : Fast Phase Towards the Floor )

### Etiology:

- The most common cause of vertigo in patient > 40 years
- Repeated attacks of vertigo usually of short duration less than a minute .
- Provoked by certain positions (rolling in beds, looking up ,and head rotations)
- Due to Canalithiasis: Migration of free floating otoliths within the endolymph of the semicircular canal
- Or due to Cupulolithiasis: Otolith attached to the cupula of the semicircular canal
- Can effect each of the 3 Canals, Posterior canal is involved in 90% of cases
- Not associated with any hearing impairment
- Causes: Head Injury, Viral Infection, Degenerative Disease, IDIOPATHIC

Diagnoses:

- History
- Dix-Halpike maneuver:



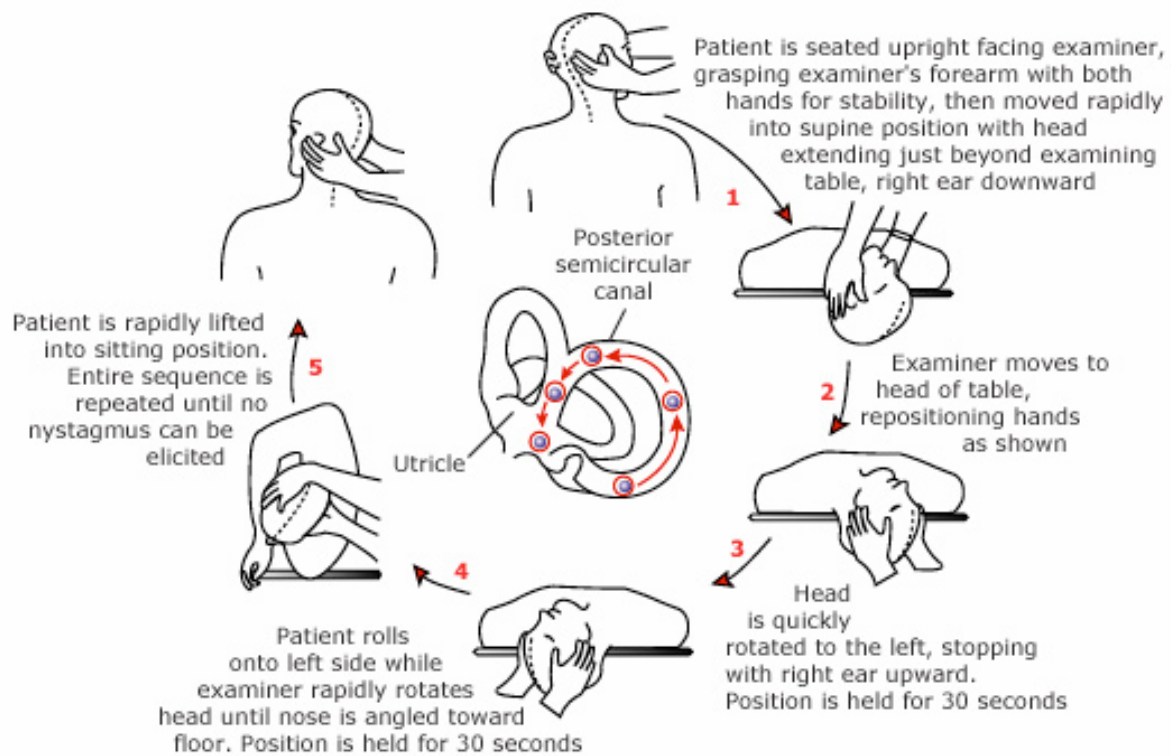
- **The Patient is Rapidly Moved from the sitting position to a supine position with the head hanging over the end of the table, turned to one side 45 degree holding the position for 20 seconds**
- **Onset** of Vertigo is noted and the eye are observed for Nystagmus

**5 sings of BPPV seen with Dix-Halpike maneuver:**

1. geotropic Rotatory Nystagmus : Fast Phase Towards the FLoor , Must be there
2. Fatigues with repeated Maneuver
3. Reversal of Nystagmus upon sitting up
4. Latency of 20 Sec
5. Crescendo/ decrescendo Vertigo Lasting 20 Seconds

**Treatment:**

- Reassure the Patient that it resolves spontaneously
- Practical Repositioning Maneuver:
  1. Eplys Maneuver ( Preformed by Doctor )
  2. Brandt- Daroff Exercises ( Preformed by Patient )
- Surgery: For refractory Cases
- Anti emetic



**Epley Maneuver**



### 3. Meneires disease (Endolymphatic hydrops )

#### Definition:

Episodic attacks of Tinnitus, hearing Loss, Aural Fullness and Vertigo Lasting Minutes to Seconds

#### Pathophysiology :

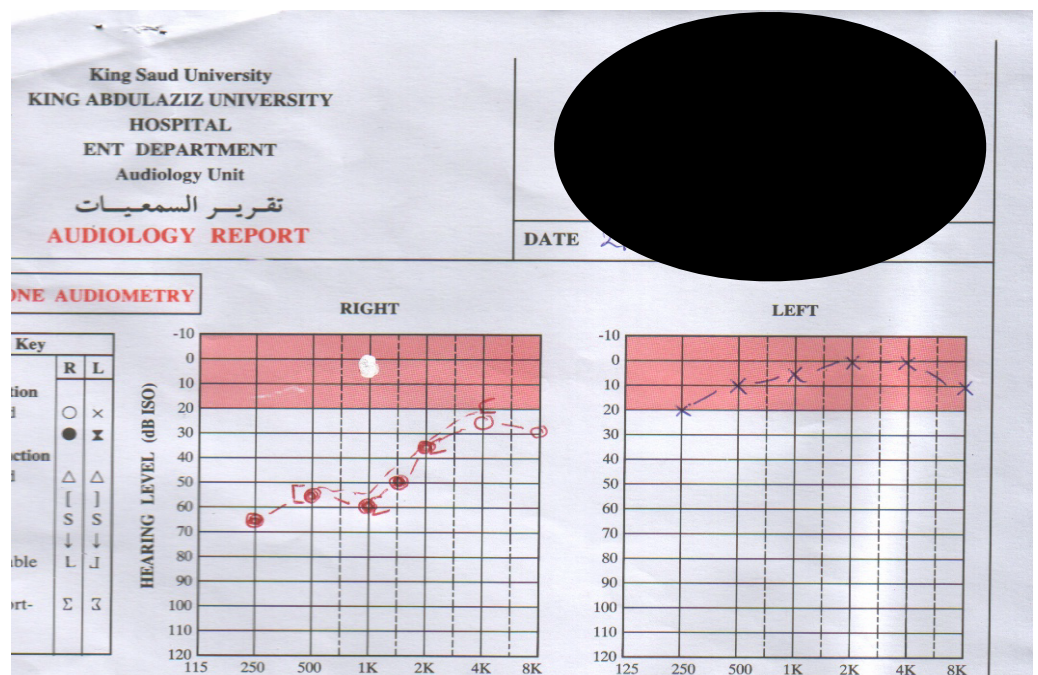
- Unknown etiology
- $\uparrow$   $\downarrow$  production of fluid within inner compartment

#### Clinical Features:

1. Syndrome Characterized by Vertigo, Fluctuating Low Frequency SNHL, Tinnitus and Aural Fullness
2. ( Plus/ Minus ) Drop attacks ( tumarkin crisis )
3. Nausea/ Vomiting
4. May be trigged by stress
5. In 10 - 20% of cases the disease later involves the opposite ear

#### Diagnosis

1. History
2. PTA



#### Treatment:

- Acute Management: bed rest, Antiemetic, antivertigoes drugs ( Betahistmine )
- Long Term Management :
  1. Medical: low Salt diet, Diuretics
  2. Surgical: Selective Vestibular Neuroctomy

## What are the causes of central ?

1. CVA (Cerebro vascular accident)
2. Brain tumor ( acoustic neuroma )it will cause gait problem !
3. Multiple sclerosis

### 1. CVA (Cerebro vascular accident)

- Elderly patient with chronic disease like (DM ,HTN) with sudden attack of vertigo +neurological symptoms

### 2. Brain tumor ( acoustic neuroma )it will cause gait problem !

#### Definition:

- Schwannoma of the Vestibular Portion of CN VIII
- Benign tumor
- Arise from vestibular division of VIII

#### Pathogenesis:

- Starts in the Internal Auditory Canal and Expands into Cerebellar Pontine Angle CPA, Compresses Cerebellum and brain stem

#### Clinical features:

- Unilateral SNHL or Tinnitus
- Dizziness, true Vertigo is rare because the tumor growth is slow
- Facial Nerve Palsy and trigeminal V1
- Hearing loss

**Diagnosis:**

1. MRI with Gadolinium is the Gold Standard
2. Audiogram -- SNHL
3. ABR -- Increase in the Latency of the 5Th Wave

**Treatment:**

Definitive Management is Surgical Excision

**Scenario # 1**

**The patient who is having a first ever attack of acute spontaneous vertigo :**

- Acute vestibular neuritis
- cerebellar infarction.
- **How to differentiate ?**
  - - Clinically ( General appearance of patient /nystagmus/head impulse test)
  - - Radiology

**Note That:**

- Chronic and recurrent ( BPPV )

**Scenario #2**

**The patient who has repeated attacks of vertigo, but is seen while well**

**A- Recurrent spontaneous vertigo**

- Menière's disease
- Migraine induced vertigo
- perilymph fistula

**B- Recurrent Positioning Vertigo**

- BPPV

**Scenario #3**

**The patient who is off balance**

1. Bilateral vestibulopathy
2. normal pressure hydrocephalus.
3. posterior fossa tumor

Done !