

DEAFNESS & VERTIGO

❖ DEAFNESS

○ PHYSIOLOGY OF HEARING

- *To hear voices, we need:*

-Intact Tympanic Membrane Ossicular chain

-2 functioning windows

-Acoustic separation of 2 windows.

-Functioning eustachian tube

-Functioning sensory neural apparatus

○ How common is hearing loss?

- *Overall about 1 in 10*
- *1 in 2 older than 75*
- *4% children under 5*
- *18% children under 15 in KSA*

○ Signs of Hearing Loss:

• *Talking louder than necessary*

• *Turning up volume on the TV or radio*

• *Complaints that other people “mumble”*

• *Confusion of similar sounding words (نخلة / نحلة)*

• *Lip Reading*

– *Watching a speaker’s face intently (يسوي له احراج خاصة اذا كانت المحادثة بين جنسين مختلفين)*

– *Difficulty “hearing” someone behind*

– *Having difficulty on the telephone ringing or buzzing in the ears*

○ **Hearing Loss Effects:**

- *limit activities*
- *Isolation*
- *Depression*
- *Anxiety*
- *الثالث دون اثنان يحتاجى فلا ثلاثة آانوا إذا " " Insecurity*
- *Increases psychosocial difficulties*
- *People think he/she is an idiot*

○ **Types of hearing loss:**

1- **Conductive Defects**
hearing loss (SNHL)

2- **Sensorineural**

○ **Conductive Defects:**

- *Abnormally before cochlea*
- *Bone Conduction > Air Conduction*
- *i.e. —ye rein, weber's lateralize to affected side*
- *Low frequencies are more affected.*
- *Speech discrimination is good.*

○ **CAUSES:**

✓ **External ear:**

- *Obstruct: must be complete to cause deafness e.g. wax, tumor, foreign body.*
- *Microtia = صمعاء*
- *Atresia = رتق*

✓ **Middle ear:**

• *Membrane → perforation*

• *Otitis media (ASOM)*

– *Acute suppurative*

– *Otitis media with effusion (OME)*

– *Chronic otitis media (CSOM)*

• ***Drum Retraction (Adhesive OM)***

• *Middle Ear Effusion (MEE) → treatment → putting tubes into the ears to strengthen the middle ear area to relieve the pressure.*

• ***Tympanosclerosis → most time is asymptomatic.***

• *Otosclerosis*

○ *fixation of stapes footplate.*

○ *More in Females*

○ *Worse during pregnancy*

○ *We treat it as Stapedectomy*

• *Ossicular chain disruption* ○ *Fixation*

• *Eustachian tube abnormality*

○ **Treatment**

• *Removal of obstruction*

• *Removal of fluid "myringotomy"*

• *Removal of mass ME → tympanotomy*

• *Stapedectomy → in case of ossiclesclerosis*

• *Tympanoplasty (myringoplasty + ossiculoplasty)*

• *Hearing aid "if surgery is not possible"*

- **Sensorineural hearing loss (SNHL)**

- *Lesion in cochlea → VIII n. → central pathway*

- *Air Conduction > Bone Conduction*

- *Rinne +ve. Weber lateralize to better side.*

- *Often involving higher frequencies*

- *It can be:*

- *Congenital* • *Trauma* • *Infection* • *Noise*
 - *Ototoxic* • *Presbycusis* • *Acoustic neuroma*

- **Congenital hearing loss:**

- *Deafness affects 0.2%*

- *SNHL attributed to*

- *50% genetic factors*

- *20-25% environmental*

- *25-30% sporadic*

- **Noise induce SNHL:**

- *Boilermaker's deafness*

- *one of the most common occupationally induced disabilities.*

- *Tinnitus*

- *commonly accompanied NISNHL*

- *warning sign*

- **Ototoxicity**

- ✓ **Medications:**

- Antibiotics
 - Diuretics
 - Antineoplastics
 - Antiinflammatories
 - Antimalarial agents
 - Ototoxic agents

- **Presbycusis** → (*hearing loss due to aging*)

- ***Presbycusis = Deafness + Tinnitus + Recruitment***

- ***#1 Handicapping disorder***

- ❖ **THE DEAF CHILD** (**doctor didn't mention this**)

- *I.e. hearing loss more than 90dB.*
 - *These children fail to develop speech "deaf & dumb"*

- **ETIOLOGY**

- 1. Prenatal: "before birth"**

- ***Disease to infant or mother:***

- a. Infant**

- 1. Hiebe's dysplasia**

- ***Most common inner ear anomaly***
 - ***Dysplasia only in cochlea + sacule, cochleosaccula dysplasia***
 - ***Autosomal recessive ear syndrome***

- There are many diseases that affect infant causing vertigo,, but they are not that common.***

- b. Maternal factors**

- 1. Infections**

- **TORCHES**

o Toxoplasmosis, rubella, CMV, Herpes, Syphilis.

2. Drugs

- *Aminoglycocides + quines*
- *Thialid amide → limb, heart, face*

3. Radiation: 1st Trimester.

4. Other "DM, thyroid, alcoholism Perinatal

2. Perinatal

- *Anoxia*
- *Prematurity→<1500*
- *Birth injuries→ forceps*
- *Neonatal jaundice >20% billirubin*
- *Meningitis*
- *Ofotox drugs (G)NICU*

3. Post Natal "as in adult

❖ Hearing Aids

- *Cochlear implant* →An electrical device which convert sound to electrical impulse.

(just for Sensorineural hearing loss, stimulation VIII CN)

- *Bone Anchored Hearing Aids (B.A.H.A)* →carries sound to cochlea through bone conduction.

(use in Conductive and mix hearing loss,when we cannot perform surgery)

- **Auditory brainstem implant.**

❖ VERTIGO

- **What is vertigo?**

It is an allusion of being moving or the world is moving too.

- **The components of balance system:**

- *Inner ear (3 semicircular canals and otolith organ)*
- *Cerebellum*
- *Vision (VOR)*
- *Proprioceptive*

- **Function of vestibular system:**

- *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).

- *produce motor reflexes that will maintain posture and ocular stability.*

- **any vestibular lesion cause:**

- *Imbalance*
- *posture and gait imbalance*
- *visual distortion (oscillopsia).*

- **Differential diagnosis:**
 - A) **peripheral vestibular loss**
 - B) **central vestibular loss**

1. Peripheral vestibular loss

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

a. Benign Paroxysmal Positional Vertigo (BPPV):

- *Vertigo when face is placed in certain position*
- *The most common cause of vertigo in patient > 40 years*
- *Disorder mainly in semicircular canal*
- *Precipitated by head traumas & ear infection*
- *Approach by History & positional test*
- *Diagnosis by Epley's maneuver (see book)*
- *80% of pt. cured by single maneuver*
- *Not associated with any hearing impairment*

b. Vestibular neuritis:

- *Viral infection of vestibular organ*
- *presents acutely with spontaneous nystagmus, vertigo and nausea & vomiting*
- *Sudden Severe vertigo*
- *Lasts from few days to several weeks*

- *Diagnose as meniere's disease for acute attack*
- *Usually it's self limited (only symptomatic treatment)*
- *takes 3 weeks to recover*

C.MENIER'S DISEASE

- *Endolymphatic hydrops: Endolymphatic system is distended.*
- *unknown etiology*
- *Vertigo (minutes to hours)+ SNHL + tinntius + aural filling*
- *Pathology*

o Scala Vestibuli, scala media → most affected.

o To lesser extent utricle & semicircular canal.

o Volume of Endolymph:

■ *Increase Production*

■ *Decrease Absorption*

Normally, endolymph is secreted by stria vascularis filles membeus labrynth, absorbed by endolymphatic sac. -

•CLINICAL FEATURES:

-Common in 35-60 age group.

-Male > Female

■ **Vertigo:**

- *Sudden attacks, comes in clusters with period of remission for weeks, months or even years.*
- *May be associated with nausea, vomiting, nystagmus.*
- *In severe disease → it maybe associated with vagal disturbances*

■Tullio Phenomenon:-

- *A condition where loud sound causes vertigo.*
- *This is seen in some cases of Meneir's disease. & if there are 3 functional Windows in the ear*

■Hearing Loss:-

- *During the attack*
- *May be normal in periods of remission*
- *Intolerance of loud sounds*
- *Distortion of sound (see book)*

■Tinnitus :

- *Aggravated during the attack*
- *May happen sometimes between attacks*

■Sense of fullness of pressure :

- *Examination*
 - *Nystagmus = » Toward UNAFFECTED ear.*
 - *Tuning fork — » positive Renin, Weber lateralize to better ear.*

○ INVESTIGATIONS:

- *Pure tone Audiometry*
 - o *Shows SNHL*
 - o *Lower frequencies are more affected in early stage.*
- *Caloric test:*
 - o *Bring hot and cold water and apply it in the ear. Then see Nystagmus*

- **Normally: COWS (Cold= Opposite, Warm= Same)**

- **Abnormally:**

- Decrease resonance in affected side.

- Canal Paresis in affected side.

○ **TREATMENT:**

- *Generally conservative treatment (Reassurance, decrease salt intake, decrease water intake, avoid stress)*

Treatment of Acute Attack:

- o *Reassurance*

- o *Bed rest*

- o *Vestibular sedatives (sometimes even Diazepam)*

- o *Vasodilators (Carbogen, histamine drip)*

Surgical Treatment:

- o ***Conservative:*** *Decompression of endolymphatic system. Or Endolymphatic shunt*

- o ***Destructive:*** *Labrynthectomy.*

Diagnosis	Duration of attack	hearing	Course of diseases	Treatment
Vestibular N	Days	normal	Self limited	Symptomatic
BPPV	Seconds	normal	Recurrent	Exercise
Meneire's diseaseM	Minutes to hours	Affected	Recurrent	Medical & surgical

2-central vestibular loss

A.Acoustic Neuroma

- *Benign tumor, encapsulated tumor of 8 n.*
- *Bilateral tumor seen in patients with neurofibromatosis*
- *It originates from Shwann Cells.*

•*FEATURES:-*

VIII n. symptoms:-

- *Unilateral SNHL*
- *Imbalance*

•*INVESTIGATES:*

- *Pure Tone Audiometry(PTA), speech audiometry*
- *Stapedial reflex*
- ***MRI "Gold Standard"***
- *CT*

Done by ENT team 429

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