بسم الله الرحمن الرحيم

سورة آيات الله
DEAFNESS IN CHILDREN

Ear diagram
©Vestibular Disorders Association

1. external auditory canal
2. tympanic membrane (eardrum)
3. malleus
4. incus
5. stapes
6. ligament
7. Eustachian tube
8. oval window
9. round window
10. cochlea
11. cochlear nerve
12. semicircular canals
13. utricle
14. saccule
15. endolymphatic sac
16. vestibular nerve
17. facial nerve
18. temporal bone
19. muscle
20. cartilage
21. internal auditory canal to brain
TYPES OF DEAFNESS

► Conductive
► Sensory
► Neural
► Mixed
► Non organic
CONGENITAL DISORDERS

- Genetic
- Non genetic
- Congenital disorders in childhood
CAUSES OF CONDUCTIVE DEAFNESS

- Down syndrome
- Marfan syndrome
- Treacher Collin Syndrome
- Osteogenesis imperfecta
- Otosclerosis
CONGENITAL DISORDERS CAUSING OME

- Cystic fibrosis
- Immotile cilia syndrome
- Cleft palate
- Immune deficiency disease
ACQUIRED CAUSES OF CONDUCTIVE DEAFNESS

► Inflammation
  ▪ Trauma
  ▪ Foreign body

► Wax

► Otitis externa

► ASOM

► CSOM

► OME
CAUSES OF SENSORINEURAL DEAFNESS

► Genetic
  ▪ Inherited dominant recessive x-linked

► Non-genetic
  ▪ Infections
  ▪ Ototoxic drugs
  ▪ Metabolic disorders
  ▪ Inherited dominant, recessive x-linked trait
  ▪ Rubella, CMV, Toxoplasmosis, Syphilis, HSV
PERINATAL CAUSES

- Ototoxic drugs
- Radiation
- Ultrasound
- Maternal diabetes
  - Hypoxia
  - Hyperbilirubinemia
  - Preterm delivery
  - Low birth weight
DEAFNESS IN CHILDREN

Hearing centre

80% maturation by two years
98% by 5 years

Speech centre

Development of speech

Larynx, tongue, oral cavity, pharynx
RISK FACTORS FOR HEARING IMPAIRMENT

- Positive family history
- Intrauterine infection
  - Rubella, Syphilis, CMV, Toxo (TORCH)
- Anatomical abnormalities (Ear, Head, Neck)
- Low birth weight < 1500 g
- Neonatal asphyxia
- Hyperbilirubinaemia
- Bacterial meningitis
- Ototoxic drugs
<table>
<thead>
<tr>
<th>Age Range</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>Before 2 years</td>
<td>Excellent</td>
</tr>
<tr>
<td>2-5 years</td>
<td>Good</td>
</tr>
<tr>
<td>After 5 years</td>
<td>Poor</td>
</tr>
</tbody>
</table>
Neonatal responses

- Startling reflex ( Responds to loud sound )
- Aural-palpebral reflex
- Change in heart rate
- Change in pattern of respiration
- Backward head jerk
- Moro reflex ( increase in general body activity )
Aged 4 months

- Child notices sound
- Responds by stilling and listening
- Child becomes still and smiles to a parent’s voice
Aged 6 months

- Begins to turn its head to the source of sound
Aged 9 months

- Localizes quite sound on a horizontal plane
- Turns readily to a parent’s voice
- Search for source of sound
Aged 12 months

- Localized quiet sound on any plane
- Can speak single words
Aged 24 months

- Readily localized sound and search for sound source
- By 18 months answers to simple questions like “where is your nose?”
- By 2 years picks out toys on request
- Simple speech assessment can be introduced
SUSPICION OF DEAFNESS

- Non-development of speech
- Inattentive child
- Hyperactive child
- Non-responding
- Poor performance at school
LEVEL OF DEAFNESS

- Normal hearing: 0-20 dB
- Mild hearing loss: 20-40 dB
- Moderate hearing loss: 40-60 dB
- Severe hearing loss: > 80 dB
- Complete hearing loss: No response upto 110 dB

Pre-lingual deafness
Post-lingual deafness
AUDIOLOGICAL ASSESSMENT

► Pure tone audiogram
► Tympanogram
► Brainstem evoked response audiometry (BERA)
► Confirm the degree of deafness, type and level of deafness
PREVENTION

► Prevention
► Treatment of underlying cause
► Hearing aid
► Cochlear implant
THANK YOU