Preoperative Assessment of Cochlear Implantation

By

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The purpose of the assessment process is to assess the patient’s functional hearing abilities and to determine whether these are likely to be significantly improved through cochlear implantation.
Initial Medical Assessments

a) Obtaining full medical history including family and social history.

b) Patients are assessed for relevant medical and developmental problems.

c) Reviewing medical and audiological records.

d) No medical contraindications to general anesthesia.

Clinical Otorhinolaringology Evaluation

• Complete systemic examination for medical and surgical problems.

• Conducting a complete otorhinolaringological examination.

• Otoscopic examination to determine the status of ear canal, tympanic membrane and middle ear.
Comprehensive audiological evaluation

a) Confirm the patient’s audiological status.

b) Ensure optimal hearing aid fitting and usage.

c) Determine the patient’s auditory sensitivity with hearing aids.

d) Quantify the patient’s speech perception in aided condition.
Comprehensive audiological evaluation, cont........

- **Behavioral audiometry tests**
  - Impedance test
  - Auditory Brain-Stem Response (ABR)
  - Auditory steady-state response (ASSR)
  - OtoAcoustic Emissions (OAEs)
  - Speech audiometry
  - Hearing aid fitting and assessment

Behavioral Audiometry Tests (unaided)

- **Visual reinforcement audiometry (VRA):** 6 to 36 months
  ; (preconditioned, normal head control).

- **Conditioned Play audiometry (PA):** 3 to 6 years old.

- **Conventional pure tone audiometry (PTA):** older children and adults.
Tympanometry to check the function of middle ear (SOM)

Rule out conductive hearing losses.

Impedance test

Auditory Brain-Stem Response (ABR)

Must-do test to establish hearing status of young babies less than 6 months of age.

To confirm the findings from behavioral measures, for older children especially if the reliability of the behavioral test is questionable.

Tone-burst stimulation can be used to check Residual low frequency hearing sensitivity.
Auditory steady-state response (ASSR)

The ASSR can be advantageous as it allows the use of frequency specific stimulation from low to high frequencies, and it is more sensitive to subtle residual hearing.

where as the click ABR only gives information at high frequencies only.

Oto-Acoustic Emissions (OAEs)

It reflects the status of the peripheral auditory system extending to the cochlear outer hair cells.

Used together with ABR to diagnose or rule out auditory neuropathy.
Speech audiometry

Unaided speech tests to determine speech intelligibility.

Hearing aid fitting and assessment

- It is mandatory to have HA use for all preligual children at least for 3 to 6 months prior to assessment for CI candidacy.

- Assessment of benefit from hearing-aids, which includes an Aided hearing test and an Aided Speech test

Evaluating The Functional Benefits Of The Hearing Aids:

- Abbreviated Profile of Hearing Aid Benefit (APHAB);
- Client-Oriented Scale of Improvement (COSI).
Speech and Language Evaluation

Speech And Language Assessment

a) To establish baseline levels of speech & language skills prior to implantation.

b) To ensure that the patient is optimally aided and uses hearing aid consistently during awake hours.

c) To have a minimum trial period of 3 months of speech therapy with aided hearing for candidate suitability prior to cochlear implant.

d) To prepare patient’s final report and recommendations for discussion in final candidacy meetings.
Radiological Evaluation

CT Scan;
High-resolution CT scan of the temporal bone to evaluate the patency of the cochlea.

Identification of congenital malformations and assessment of the surgical anatomy.

Assessment of the diameter of vestibular aqueduct as a prognostic indicator for progressive hearing loss.

Aeration of the mastoid and the middle ear.

Is there any variation of the pathway of the facial nerve.
Radiological Investigations, cont....

Magnetic Resonance Imaging (MRI);
MRI of the vestibulocochlear complex at fundus of IAC (oblique sagittal view)

To provide information regarding the integrity of the auditory nerves and other soft tissue;

Exploration of the IAM by MR allows the measurement of the diameter of the cochlear nerve in relation to the facial nerve taken as reference.

The status of the endo- and perilymphatic fluid? Cochlear ossification or fibrosis may limit the full insertion of the electrode array or modify the choice of the cochlear implant and the way of insertion.

Neuro-Psychological Evaluation
IQ testing to rule out other cognitive handicaps.

EEG testing (epilepsy)

Fundus examination (retinitis pigmentosa)

Patient must demonstrate psychological stability and suitable motivation with realistic expectations for outcomes.

The degree of success depends on patients and their families being active participants in the process (e.g., auditory training, speech/language therapy, etc)

Thanks for your attention