SOUTH AFRICAN COCHLEAR IMPLANT GROUP

SUID - AFRIKAANSE KOGLEERE INPLANTINGSGROEP

APPENDIX B:

Guidelines for Referral and Candidacy for Cochlear Implantation, including guidelines for unilateral and bilateral cochlear implantation

The following guidelines have been developed to represent the most common practice through consideration of published evidence and clinical experience. It is acknowledged that guidelines/criteria for implantation are under active research internationally and, it is therefore expected that these guidelines will develop further over time.

The following references are recommended to use as a guide for current SACIG selection criteria:

Dowell, R.C et al, (2004) Outcomes for cochlear implant users with significant residual hearing. Implications for selection criteria in children. Archives Otolaryngology, 130, May: 575-581.

Gifford, R.H. et al (2010) Evidence for the expansion of adult cochlear implant candidacy. Ear & Hearing, 31, 2:186-194. 3.

Cochlear implantation should be considered only after an assessment by a multidisciplinary team (who are members of SACIG) which should include an ENT surgeon, audiologist, radiologist and speech-language therapist in the case of children. For more complex cases other specialist inputs may be required (e.g. a psychologist / social worker / medical specialist, Allied Health specialist).

AUDIOLOGICAL CRITERIA

Cochlear implants are recommended for:

A. **CHILDREN** (6 months and older)

1. Bilateral moderate to severe sensorineural hearing loss in the low speech frequencies and severe to profound hearing loss in the high frequencies;
2. In the case of asymmetrical hearing loss (mild to moderate sensorineural hearing loss in the better ear and moderate to profound sensorineural hearing loss in the poorer ear), special consideration should be given to speech, language and educational progress with best fitted hearing aids in determination of candidacy for the poorer ear;

3. Who obtain minimal or no benefit from appropriately fitted binaural hearing aids and show limited progress in spoken language development while under management of an appropriately trained speech-language therapist (**Appendix A**)

4. In cases of sudden onset or progressive hearing loss, speech perception scores should reflect minimal hearing aid benefit which would negatively impact on further speech / language / academic progress.

5. The degree of hearing loss in children with confirmed Auditory Neuropathy Spectrum Disorder (ANSD) does not correlate with their speech perception ability and progress in speech and language development.

6. Children with multiple handicaps: cochlear implantation should be considered within the context of improvement of quality of life and be within the financial reach of the family for life-long management considering the cumulative medical and rehabilitation expenses required for these children.

B. **ADULTS** (18 years and older)

1. Bilateral, postlingual moderate to severe sensorineural hearing loss;
2. Asymmetrical hearing loss where the better ear has mild to moderate sensorineural hearing loss and severe to profound sensorineural hearing loss in the poorer ear;
3. Achieve limited benefit from appropriately fitted binaural hearing aids after a minimum trial period of ±3 months. Hearing aid limited benefit is confirmed by aided word recognition scores of poorer than 40% in the ear to be implanted (see **Appendix F**)

4. The degree of hearing loss in adults with confirmed Auditory Neuropathy Spectrum Disorder (ANSD) does not correlate with their speech perception ability and they should be considered for cochlear implantation.

CANDIDATES FOR ELECTROACOUSTIC STIMULATION (EAS)

Hearing thresholds in the low frequencies (250Hz and 500Hz) could be at normal to mild levels in low frequencies and in the middle to high frequencies (>1000Hz) at severe to profound levels. Word recognition scores are more representative of the impact of the hearing loss on speech perception and communication ability.

PRELINGUALLY OR PERILINGUALLY DEAFENED OLDER CHILDREN AND ADULTS

These patients with severe to profound sensorineural hearing loss are considered for cochlear implantation if they use spoken language as their primary mode of communication and obtain little or no benefit from hearing aids.

MEDICAL CRITERIA

1. The auditory nerve should be present.
2. The cochlea should be sufficiently patent for electrode insertion
3. The surgical procedure can be performed with minimal risk to the person
4. No active middle ear inflammatory condition

REHABILITATIVE CRITERIA

Prospective implant recipients and their families should:

1. be well motivated
2. have demonstrated commitment to the rehabilitative process, and
3. have appropriate expectations of the potential benefits of an implant.

FINANCIAL RESOURCES

Socioeconomic factors should ensure a realistic probability that the family will be able to support and maintain the device as well as rehabilitation over the period of their lives.

ADDITIONAL CONSIDERATIONS:

- BILATERAL IMPLANTATION;
- SINGLE-SIDED DEAFNESS;

BILATERAL COCHLEAR IMPLANTATION:

A. BILATERAL COCHLEAR IMPLANTATION IN CHILDREN.

Considerations below are for children with bilateral congenital hearing loss.

There is no restriction of age for children with progressive hearing loss (assuming they have had auditory input via hearing aids for children with a longer duration of progressive hearing loss).

Care of the child who is a cochlear implant (CI) candidate should include a strategy for the treatment of hearing loss in both ears.

Guidelines for simultaneous and sequential implantation are listed below.

A.1 SIMULTANEOUS IMPLANTATION

Unimplanted children are best considered for a simultaneous implantation when they meet the following criteria:

• Bilateral sensorineural hearing loss in the severe to profound audiometric range of CI candidacy

• ±6 to ±36 months of age (*) (this is the optimal period of auditory plasticity therefore early bilateral implantation results in better outcomes). Later implantation can be considered in special circumstances up to 48 months if the child has developed some spoken language.

• Labyrinthine (cochlear and vestibular), IAC, mastoid, middle ear, and ear canal anatomy that does not preclude appropriate electrode insertion.

• Recent history of meningitis with otologic involvement.

• No active inflammatory middle ear or mastoid disease.

• No medical conditions that significantly increase surgical risk

- No co-existing significant neurological condition that may negatively influence CI benefit.

• Parent perception of little to no useful hearing in either ear with a hearing aid confirmed by audiological assessment

• Parent comfort with a comprehensive CI treatment approach and the potential loss of residual hearing.

A.2 SEQUENTIAL IMPLANTATION

A.2.1 Criteria for unimplanted children

Unimplanted children may be considered for a sequential approach when they do not meet criteria for simultaneous implantation because any of the following conditions exist:

• Question about the usefulness of residual hearing in either ear (implant worst hearing ear first).

• Older age at presentation (*) (>36 months) with less predictable CI outcome (implant ear with better hearing history/predictors in each ear).

• History of vestibular disturbance that raises concern about the effect of CI on vestibular function and/or symptoms. Prior to implantation a vestibular assessment should be completed to assist with selection of the ear.

• Presence of abnormal labyrinthine or altered mastoid/middle ear/ear canal anatomy in either ear requiring special surgical techniques for implantation (implant best anatomically developed ear first if equal hearing in each ear).

• Concern about the influence of co-existing medical/developmental conditions (e.g. neurological conditions and sensory processing disorders) on CI benefit or that increase the risk of surgery.

• Parent perception that useful hearing exists in either ear with a hearing aid.

- History of good compliance during therapeutic intervention with the first implantation.

• Parent reluctance to sacrifice hearing in both ears simultaneously.

A.2.2. Criteria for children already unilaterally implanted

Implantation of the second ear is appropriate when the following criteria are met:

• In addition to the second ear meeting CI candidacy criteria, there should be minimal measurable binaural advantage on age appropriate speech perception measures in the bimodal condition (CI + contralateral HA) compared to the CI alone. Tests should be selected to avoid ceiling and floor effects.

• Parent/patient perception of little or no added benefit from using a HA in the unimplanted ear in conjunction with CI use in the opposite ear.

• Parent/patient comfort with loss of residual hearing in the second ear.

- History of good compliance during therapeutic intervention with the first implantation.

• Parent/patient acceptance of a potentially difficult age-related adjustment period and limit to benefit, and the need to reinstitute appropriate speech-language therapy services (**Appendix A**).

- If there is a history of vestibular problems a comprehensive vestibular assessment should be completed prior to implantation of the second ear.

B. BILATERAL COCHLEAR IMPLANT CANDIDACY: ADULTS

Care of the patient who is a cochlear implant (CI) candidate should include a strategy for the treatment of hearing loss in both ears. Guidelines for simultaneous and sequential implantation are listed below.

B.1 SIMULTANEOUS IMPLANTATION

It is generally recommended that sequential implantation is preferable due to the risk of vestibular involvement post-implantation. An exception would be where there are radiological signs of potential ossification which could preclude future implantation in that ear. A vestibular assessment (see **Appendix F**) should be considered for adults and older children

Unimplanted adult patients may be considered for simultaneous implantation when they meet the following criteria:

• Bilateral hearing loss in the profound audiometric range of CI candidacy for both ears.

• Postlingual onset of hearing loss in both ears.

• Duration of profound hearing loss <30 years in both ears.

• History of recent meningitis with otologic involvement (should be considered as emergency for implantation)

• Normal labyrinthine (cochlear and vestibular) anatomy.

• No active inflammatory middle ear or mastoid disease or history of canal wall mastoid surgery in either ear.

• No history of significant vestibular disorders, however the patient needs to be counselled regarding potential complication of vestibular sequelae. If an existing history of vestibular/disequilibrium disorders exists, the patient should undergo a comprehensive vestibular assessment.

• No medical conditions that significantly increase surgical risk or co-existing conditions that may influence CI benefit (such as neurologic disorders).

• Patient perception of little to no useful hearing in either ear with a hearing aid.

• Patient comfort with a comprehensive CI treatment approach and the potential loss of residual hearing in both ears.

B.2 SEQUENTIAL IMPLANTATION

B.2.1. CRITERIA FOR UNIMPLANTED PATIENTS

Unimplanted adult patients may be best considered for a sequential approach when they do not meet criteria for simultaneous implantation because any of the following conditions exist:

• Hearing loss in the “severe” (as opposed to profound) audiometric range of CI candidacy for either ear (implant worst hearing ear first).

• Prelingual or perilingual onset of hearing loss or long term (>30 years) profound deafness in either ear. (Implant ear with best hearing history first.)

• History of vestibular disturbance that raises concern about the effect of CI on vestibular function and/or symptoms. A vestibular assessment should be conducted prior to implantation, the ear with the weaker vestibular system should be implanted first (**Appendix F**).

• Presence of abnormal labyrinthine or altered mastoid/middle ear anatomy in either ear requiring special surgical techniques for implantation.

• Concern about the effect of coexisting medical conditions on CI benefit or that increase the risk of surgery.

• Patient perception that useful hearing exists in either ear with a hearing aid.

• Patient reluctance to sacrifice hearing in both ears simultaneously.

- No history of significant vestibular disorders, however the patient needs to be counselled regarding potential complication of vestibular sequelae.

B.2.2. CRITERIA FOR PATIENTS ALREADY UNILATERALLY IMPLANTED

Implantation of the second ear is appropriate when the following criteria are met:

• In addition to the second ear meeting CI candidacy criteria, there should be minimal measurable binaural advantage demonstrated in the bimodal condition (CI + contralateral HA) compared to the CI alone condition. Tests should be selected to avoid ceiling and floor effects.

• Although good function of the first CI is preferred, implantation of the second ear can be considered in the event of less than expected first CI performance if there is hope of “capturing” a better performing ear.

• Patient perception of little or no added benefit from using a HA in the opposite ear with CI.

• Patient comfort with loss of residual hearing in the second ear.

- No history of significant vestibular disorders, however the patient needs to be counselled regarding potential complication of vestibular sequelae. A vestibular assessment should be conducted prior to implantation of the second ear (**Appendix F**).

SINGLE-SIDED DEAFNESS

SSD has been defined by an international consensus statement as a ‘severe-to-profound’ hearing loss in one ear (pure tone average >60dB HL) and normal or near-normal hearing in the contralateral ear (pure tone average <30 dB HL) and has a prevalence of about 1% of the general population (Vincent, Arndt & Firszt, 2015; Lucas, Katiri & Kitterick 2018; Davis, 1995). This does not however mean that all individuals with SSD are candidates for cochlear implantation as they still need to fulfil all cochlear implant assessment criteria in accordance with South African Cochlear Implant Group guidelines.

The SACIG Position statement and guidelines for SSD are outlined in Appendix C.