Cochlear implants

for treating adults with single-sided deafness (SSD)

Technology Guidance from the MOH Medical Technology Advisory Committee (MTAC)

Guidance Recommendations

The Ministry of Health's MTAC has not recommended subsidising cochlear implants in the treatment of adults with single-sided deafness (SSD).

Subsidy status

Cochlear implants are not recommended for subsidy in adults with the abovementioned indications.

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Factors considered to inform the recommendations for subsidy

Technology evaluation

1.1 The MOH MTAC ("the Committee") considered evidence presented for the technology evaluation of cochlear implants for adults with single sided deafness (SSD). The evaluation was conducted in consultation with clinical experts from public healthcare institutions. Available clinical and economic evidence for cochlear implants was considered for adults with SSD and in line with the registered indication.

1.2 The evidence was used to inform the Committee's deliberations around five core decision-making criteria:

- Clinical need of patients and nature of the condition;
- Overall benefit of the technology for the patient and/or the system;
- Cost-effectiveness (value for money), which covers the incremental benefit and cost of the technology compared to existing alternatives;
- Estimated annual technology cost and the number of patients likely to benefit from the technology;
- Organisational feasibility, which covers the potential impact of adopting technology, especially barriers for diffusion.

1.3 Additional considerations, such as ethical or social issues related to adoption of the technology, may also be part of the Committee's deliberations.

Clinical need

2.1 SSD is severe-to-profound sensorineural hearing loss or non-functional hearing in one ear and normal or near normal hearing in the other ear. Despite normal or near-normal hearing in one ear, unaided adults with SSD often experience difficulties localizing sound or conversing in an environment with background noise. The Committee noted that steroids are the first line of treatment for adults with SSD. If failed, there is a need to consider other treatment options including bone conduction hearing implants (BCHI), conventional contralateral rerouting of signals (CROS) hearing aids, wearable bone conduction devices (BCD) and cochlear implants.

Clinical effectiveness and safety

3.1 The Committee noted that cochlear implantation in adults with SSD intends to reinstate the auditory input from the deaf ear and re-engage binaural hearing. The Committee agreed that the main comparators to cochlear implantation are BCHI and no treatment, whereas CROS hearing aids or wearable BCD are considered secondary comparators.

3.2 Cochlear implantation is considered a reasonably safe procedure. The Committee noted that safety outcomes were based predominantly on the evidence from a wider population of patients with bilateral deafness. Complications were observed in less than 20% of implantations, with a relatively small proportion of patients requiring revision (5% to 10%). Additional evidence on adults with SSD showed a 5% complications rate.

3.3 The Committee noted that the evidence base for adults with SSD was limited and comprised pre-post case series with small sample sizes where cochlear implant was compared with no treatment. Cochlear implantation was associated with moderate improvement in functional and patient reported outcomes (speech audiometry, sound localisation, tinnitus and hearing- and health related quality of life), with varying degree of clinical meaningfulness.

3.4 The Committee noted that, based on only one small case series, cochlear implantation was associated with moderately improved functional and patient reported outcomes when compared with rerouting devices (CROS hearing aids, wearable BCD).

3.5 The Committee noted that none of the studies compared cochlear implantation with BCHI. There is also lack of evidence on the longer-term benefits of cochlear implantation such as social impact or employment retention in adults with SSD.

3.6 Overall the Committee noted that the evidence was of low quality and of uncertain relevance to local clinical practice. The main limitation was lack of comparison between cochlear implants and BCHI, the main alternative technology improving hearing related outcomes in patients with SSD.

Cost-effectiveness

4.1 The Committee noted that no local cost-effectiveness analysis was conducted. One published economic analysis by Health Quality Ontario compared cochlear implantation with no treatment, reporting ICERs between CA$18,000 and CA$56,000 per QALY gained. There were no studies comparing cost-effectiveness of cochlear implantation with other hearing improving technologies. The Committee noted that the economic evidence was associated with highly uncertain utility values estimated in only one small pre-post case series. The Committee also noted that the relevancy, reliability and transferability of published economic evidence to the Singapore setting was limited and uncertain.

4.2 The Committee noted that due to high costs and lack of comparative evidence of cochlear implants versus other hearing improving technologies, including BCHI, its use in adults with SSD is unlikely to be cost-effective in Singapore.

Estimated annual technology cost

5.1 The Committee noted that the estimated annual cost of providing cochlear implants for adults with SSD is likely to be more than $5 million. About 200 adults with SSD across the public healthcare institutions would likely receive government subsidy for cochlear implants, if available.

Additional considerations

6.1 The Committee noted that there is a viable subsidised treatment alternative, a BCHI, for adults with SSD in Singapore.

6.2 The Committee noted that most of the reference countries do not reimburse cochlear implants for adults with SSD using government funding. Two countries restricted reimbursement only to very severe cases with coexisting conditions, i.e. adults with SSD and incapacitating tinnitus.

Recommendation

7.1 Based on the lack of comparative evidence with other hearing improving technologies, uncertain cost-effectiveness, and high potential annual technology cost, the Committee recommended against subsidising cochlear implants for the treatment of adults with SSD.

About the Agency

The Agency for Care effectiveness (ACE) is the national health technology assessment agency in Singapore residing within the Ministry of Health. It conducts evaluations to inform the subsidy of treatments, and produces guidance on the appropriate use of treatments for public hospitals and institutions in Singapore. When using the guidance, the responsibility for making decisions appropriate to the circumstances of the individual patient remains with the healthcare professional. This guidance is based on the evidence available to the Committee as of 6 July 2021.This guidance is not, and should not be regarded as a substitute for, professional/medical advice. Please seek the advice of a qualified healthcare professional on any medical condition.

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