

Auditory Brainstem Implants; A Strategic Hearing Rehabilitation Beyond Cochlear Implant

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Hearing impairment is a global health care problem posing additional economic burden on the society. About 15% of the population in Pakistan is hearing impaired and majority of its causes are preventable¹. In Pakistan, rehabilitation of hearing impaired is currently based on different types of conventional hearing aids. Only few centers are offering bone anchored hearing aids (BAHA) and cochlear implants for selected adults and children with bilateral severe to profound sensori-neural hearing loss who derive limited benefits from conventional hearing aids. Cochlear implantation requires a functioning cochlear nerve with a cochlear anatomy which does not preclude implantation. Therefore there are instances where cochlear implantation is either not possible, inappropriate or not indicated. Stringent criteria should be adapted for the cochlear implant candidacy as it involve meticulous workup and ample amount of financial liability. Recently auditory brainstem implants (ABI) is offered in the situation where cochlear implant is in-appropriate or not indicated.

First auditory brainstem implant (ABI) was performed by Hitselberger and House in 1979 at Los Angeles USA². This was a simple ball type electrode implanted in a patient with neurofibromatosis type 2 (NF2) after removal of vestibular schwannoma. Using a modified body worn hearing aid, this device provided useful auditory response. Based on this initial experience a two electrode and later three electrode mesh type array was developed by Huntington Medical Research Institute (Pasadena, CA, USA)³. Later on the same institute in conjunction with cochlear corporation developed 8- electrode and 21- electrode array after the suggested feasibility of multichannel stimulation. Richard Ramsden and his auditory implant team at Manchester UK used this multichannel implant primary as a part of the rehabilitation of the individuals with NF-2. Currently two types of brainstem implants are available. One from Cochlear Ltd with 21-electrode system (Nucleus 24 ABI system or ABI 24) and other Med-EL ABI with a 12 contact electrode array. An additional reference electrode is provided for advanced telemetry measurement providing added functional reliability and control.

An ABI implant is similar to a cochlear implant and has an external component comprising of a microphone headset, sound processor and a transmitter coil. The internal (implanted) part has an antenna coil, receiver-stimulator and electrode array designed for insertion into the lateral recess of the 4th ventricle of the brainstem⁴.

The indication for potential ABI recipients fall into two broad group; 1) Tumour group esp NF-2 and 2) Non-tumour group. In NF-2 group, patients developed SNHL due to cochlear ischaemia, direct pressure by tumour on cochlear nerve or surgical resection of the tumour. Non-tumour group includes children with congenital bilateral hearing loss that precludes cochlear implantation, usually due to inner ear malformations and / or cochlear nerve hypoplasia/aplasia. Acquired causes includes post meningitis ossification of the cochlea, severe cochlear otosclerosis, trauma and temporal bone dystrophy⁵. ABI workup involves team of surgeons ,electrophysiologist, audiologist and speech therapist.

Speech perception results and auditory sensation provided by ABI can be very useful in facilitating oral communication. ABI is an established intervention in selected individuals. In lieu of emerging and promising results from developed countries and even from neighbourhood developing countries, it is eminent that otologists of our country who are engaged in auditory rehabilitation should take a lead to get themselves acquainted and trained for ABI to bring rehabilitation of hearing impaired at par with global trends.

REFERENCES:

1. Zaidi S.H. Deafness in Pakistan. Pak J.Otolaryngol Head Neck Surg 1999;15:40-2.
2. Hitselberger WE, House WF, Egerton BJ, Whitaker S. Cochlear nucleus implants. J Otolaryngol Head Neck Surg. 1984;92;1:52-4.
3. Brackmann DE, Hitselberger WE, Nelson RA, Moore J, Waring MD, Porollo F, Shannon RV, Telischi FF. Auditory brainstem implant; Issues in surgical implantation. Otolaryngol Head Neck Surg 1999;108;6:624-33.
4. Khalil. S, Saeed SR. Auditory brainstem implants. ENT and audiology news;2012;21;1:50-3.
5. Sennaroglu L, Colletti V, Mannque M, Laszig R, Offeciers E, Saeed S, Ramsden R, et al. Auditory brainstem implantation in children and non NF-2 patients; a consensus statement. Otol Neurotol 2011;32;2:187-91.

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