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Editorial

Cochlear Implant Surgery: Bangladesh Perspective

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A cochlear implant (CI) is a sophisticated medical device designed to help individuals with severe to profound hearing loss. Unlike traditional hearing aids, which amplify sound, cochlear implants work by directly stimulating the auditory nerve bypassing Cochlea.CI is particularly useful for individuals with sensorineural hearing loss especially prelingual children with speech and language delay. These children are added to the pool of our national disabled future citizens.People with this type of hearing loss typically do not benefit from conventional hearing aids.CI allows individuals to perceive sound, develop speech and language in prelingual children and improve their ability to communicate and contribute to the society.

The CI system consists of two primary components: an external portion and an internal portion. The external part includes a microphone and a speech processor. The microphone picks up sound from the environment, while the speech processor converts it into digital signals. These signals are transmitted to the internal component, which contains a receiver/stimulator placed under the skin behind the ear, and an electrode array inserted into the cochlea of the inner ear. The electrodes stimulate the auditory nerve with electrical signals, which are then transmitted to the brain and interpreted as sound.

The implantation process is surgical and requires a skilled surgical team and specialized instrumental set up in the operation theatre.After implantation, the device is programmed to meet the patient's hearing needs, and the individual may undergo auditory rehabilitation to adjust to the new sound experience. While cochlear implants do not restore natural hearing, they significantly improve the ability to understand speech and engage in conversations, greatly enhancing the quality of life for individuals with profound hearing loss.

Developed in the 1970s by Dr. Graeme Clark, the multi-channel cochlear implant revolutionized hearing loss treatment, enabling individuals to hear and communicate effectively. Since then, the technology has transformed the lives of many people worldwide.The history of cochlear implants dates back to the mid-20th century, with early experiments exploring the possibility of restoring hearing through direct stimulation of the auditory nerve. In the 1950s, French researchers André Djourno and Édouard Gellé

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successfully demonstrated nerve stimulation in animals, laying the groundwork for future developments. In the 1970s, Australian engineer Graeme Clark developed the first multi-channel cochlear implant, which used electrodes to stimulate different parts of the cochlea, mimicking natural hearing. The first successful implantation occurred in 1978. Throughout the 1980s, cochlear implants gained recognition, with the technology improving and being commercialized by Cochlear Limited, founded by Clark. The FDA approved cochlear implants for use in adults in 1985 and for children in 1990. By the 1990s, the implants became more advanced, with better sound processing and the introduction of bilateral implants. In the 2000s and beyond, continued innovation led to improved devices, including wireless connectivity, hybrid implants combining hearing aids and cochlear implants, and enhanced sound quality. Today, cochlear implants are widely used to restore hearing in people with profound hearing loss, offering a significant improvement in quality of life.

The first cochlear implant surgery in Bangladesh was performed at Society for Assistance to Hearing Impaired Children (SAHIC) Hospital, Dhaka. This ground breaking procedure marked the beginning of cochlear implant surgery in the country. Following this success, the second cochlear implant surgery in Bangladesh was carried out at Sir Salimullah Medical College and Mitford Hospital, also in Dhaka. These initial implants conductedby our fore runners paved our today's pathway.

Currently, several institutions in Bangladesh, both public and private, are performing cochlear implant surgery. Among them National Institute of Ear, Nose & Throat (NIENT), Bangabandhu Sheikh Mujib Medical University (BSMMU), Sir Salimullah Medical College and Mitford Hospital, Mymensingh Medical College, Combind Millitary Hospital (CMH) Dhaka, CMH Chittagong, MAG Osmani Medical College Hospital, Sylhet, Faridpur Medical College Hospital, SAHIC, and Evercare Hospital Dhaka, Bangladesh ENT Hospital Ltd should be mentioned. More than 2000 patients received Cochlear implants from these hospitals.

The cochlear implant program in Bangladesh is financed by Ministry of Social Welfare but is implemented by the above mentioned institutions. Cochlear implant program involves fund allocation, patient selection, surgical implantation and post-implant rehabilitation like long auditory verbal therapy (AVT). Delay in the process of fund allocation by the Ministry of Social Welfare is not an unusual event. The project coordinator has to follow strictly the government procurement rules adding more delays in the process. But, on the contrary, allotted fund has to be spent within the national budgetary time frame. This prolonged administrative process results in inefficiencies and gaps in service delivery to the patients. A time framed approach, inter-ministerial coordination and management systems, empowering the institutes with financial autonomy in expenditure and procurement would improve efficiency of this specialized service by ensuring cochlear implantation and comprehensive post implantation rehabilitation for children.

Auditory verbal therapy (AVT) is crucial for developing speech and language skills in children following implantation. In Bangladesh, challenges like lack of skilled AVT professionals, limited infrastructural facility in this field in the centers are also issues to be addressed. All cochlear implantee should be allocated with a unique software based identification number and a universal AVT

schedule and a web based monitoring system must be adopted throughout the country. These steps will also allow us to monitor, evaluate and identify the challenges of this national program. A centrally coordinated research program must be commissioned to evaluate the success and pitfalls of our current programwhich will pave us the pathway of our future modification in planning to alleviate the sufferings of the deaf children and their family members.

The goal of 'sound hearing' 2030 program is to reduce avoidable hearing impairment to 90% by the year 2030. Properly addressingthe cause of deafness in our population especially children, public-private initiativesin alleviating deafness from our society and increasing awareness of health personals in referring these deaf children fulfilling criteria for CI to the government sponsored cochlear implant program would help us to achieve the goal of SOUND HEARING 2030.

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