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Editorial

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Cochlear Implant Surgery in Sir Salimullah Medical College Mitford Hospital

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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 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

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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 groundbreaking 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 Mitford Hospital (SSMCMH), also in Dhaka. These initial implants conductedby our fore runners paved our today's pathway.

The cochlear implant program in Bangladesh is mainly financed by Ministry of Social Welfare, Govt. of Bangladesh. Cochlear Implant program in SSMCMH is also a part of that government program.Under that program, the first CI was doneon July15, 2024.We have received 44 devices and out of them 42 devices have been implanted to the patients. Male: Female ratio is (19: 23). Highest age of the patients was 5 yearsand lowest was 1.5 years. Five of them completed the Auditory Verbal Therapy (AVT) and ready for admission in preschool program. Of those who are currently on the AVT are doing good and in the process of significant improvements including ability to match the colour & drawing, performing the task of puzzle. Aided audiogram also revealed good response among them. A few of them showed hyperactivity and referred to Institute for pediatric Neuro-disorder and Autism (IPNA) in Bangladesh Medical University (BMU).Furthermore some guardians tend to be reluctant regarding the post-operative AVT.

The cochlear implant project in Bangladesh represents a transformative milestone in the country's healthcare landscape. By restoring hearing to children and adults with profound sensorineural hearing loss, the program is not only improving communication abilities but also enhancing educational opportunities, social integration, and overall quality of life. With continued government support, skilled multidisciplinary teams, public awareness, and sustainable funding strategies, cochlear implantation can become more accessible, equitable across the nation to achieve the goal of SOUND HEARING 2030.

Strengthening local expertise and expanding services beyond major cities will further ensure that no child is deprived of the gift of sound. The success of this initiative reflects Bangladesh's commitment to inclusive healthcare and offers hope for a future where hearing impairment is no longer a barrier to participation and productivity.

Keywords: Cochlear Implant, Cochlear Implant Surgery, Hearing loss, Auditory Verbal Therapy