

Hearing Aid use before Cochlear Implantation-Is it Mandatory?

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Background: Patients having severe to profound sensory neural hearing loss can be potentially benefitted by Cochlear Implant. Using Hearing Aid pre-operatively in such patients sensitizes vestibulo-cochlear nerve & Auditory & Language areas in the brain. **Objective:** Objective of the study was to evaluate role of using Hearing Aid pre-operatively in patients who are going to be operated for Cochlear Implant. **Method:** The study was conducted in Department of ENT, Civil Hospital, Ahmedabad from June 2014 to June 2015. We studied & evaluated Hearing & Speech Abilities following cochlear implant in 30 patients of age group 1-7 years who used Hearing Aid pre-operatively for duration of at least 6 months. Control group was 30 children of 1-7 year of age who did not use hearing aid pre-operatively. All the subjects underwent Auditory Verbal Training by certified Speech & Language Pathologist and the benefits were evaluated on Categories of Auditory Performance Scale & Speech Intelligibility Rating Scale. **Result:** Patients in case group showed significantly better score on Category of Auditory Performance Scale & Speech Intelligibility Scale within same time frame which was taken as 3 months, 6 months, 9 months & 12 months duration. However parental motivation & home training were also important. **Conclusion:** Using hearing aid pre-operatively in patients with cochlear implant confirms better Hearing & Speech Abilities compared to patients who did not use Hearing aid pre-operatively. So use of Hearing Aid should be offered pre-operatively to the patients who are going to be operated for Cochlear Implant.

Keywords: Cochlear Implant, Congenital Deafness, TORCH infection, Hearing Aid, CAP & SIR scale

1. Introduction

Sensory neural hearing loss can be mild, moderate, severe, profound or total. It may be congenital or acquired and congenital variety is followed by genetic mutation or environmental factors such as TORCH infection. Patients having severe to profound sensory neural hearing loss can be potentially benefitted by the Cochlear Implant. A hearing aid or deaf aid is an electroacoustic device which is designed to amplify sound for the wearer, usually with the aim of making speech more intelligible, and to correct impaired hearing as measured by audiometry. Many patients with severe to profound sensory neural hearing loss are using Hearing Aid pre-operatively which may sensitize Vestibulo-cochlear nerve & Auditory-Language areas in the brain. It will be interesting to see whether it improves auditory & verbal response following the cochlear implantation.

2. Objectives

Objective of the study was to assess & evaluate the Auditory as well as Verbal response following cochlear implantation in congenitally deaf & mute patients who used hearing aid pre-operatively in both the ears for at least duration of 6 months & compare it with the control group who did not use hearing aid pre-operatively before implantation. By comparing between two groups we can justify the use of pre-operative hearing aid trial who later on under gone cochlear implantation.

3. Methods

The study was conducted in Department of ENT & Head-Neck Surgery, B. J. Medical College, Civil Hospital, Ahmedabad from June 2014 to June 2015. The present study was approved by the Ethics Committee on Human Subjects of the institute, and informed consent was obtained from parents of all patients.

Participants	Criteria	Tools
<ul style="list-style-type: none">• Case group: 30 patients who used bilateral digital Hearing Aid pre-operatively for at least duration of 6 months.• Control group: 30 patients who did not use Hearing Aid pre-operatively	<ul style="list-style-type: none">• Bilateral Severe to Profound Hearing Loss• Age : 1-7 years• No additional problems	<ul style="list-style-type: none">• Categories of Auditory Performance Score (CAP)• Speech Intelligibility Rating (SIR)

However the sample size here is small. In terms of development of the speech over a long period of time this small difference can affect learning.

- In the study of the effects of age at cochlear implantation and hearing aid trial on auditory performance of Chinese infants it was found that Infants undergoing hearing aid trial and habilitation demonstrated a significant positive effect on the development of auditory skills in comparison with infants without trial and habilitation. (3)
- Using hearing aid pre-operatively in patients before cochlear implant sensitizes the vestibulo-cochlear nerve and Auditory & Language areas in the brain which in turn confirms better Hearing & Speech Abilities compared to patients who did not use Hearing aid pre-operatively. (4)
- Regular use of hearing aid helps in rapid adapting of the patient to regular use of the Cochlear Implant. (5)
- So use of Hearing Aid should be offered pre-operatively to the patients who are going to be operated for Cochlear Implant. However parenteral motivation & home training is equally important. (6)

7. Conclusion

Hearing aids should be offered pre-operatively to the patients undergoing cochlear implantation for better auditory-verbal outcome. Not only it improves CAP score and SIR but it also sensitizes a patient to wear future cochlear implant external processor. Still we require study with large subject group with longer follow up to conclude more firmly. Development of speech is also dependent on motivation of parents and their ability to give speech therapy to child at home. In future we may consider educational status of parents in such type of studies.

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