ORIGINAL RESEARCH

Assessment of outcomes of cochlear implantation in children with multiple disabilities

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ABSTRACT

Background: Children who have hearing loss may experience severe consequences for their speech and language development, leading to a double tragedy where they completely lose their ability to communicate naturally. The present study was study was conducted to assess outcomes of cochlear implantation in children with multiple disabilities. **Materials & Methods:** 104 deaf children of both genderswere divided into 2 groups of 52 each. Group I comprised of 52 deaf children with multiple disabilities and group II were deaf children without any additional disabilities. All children underwent cochlear implantation. Category of Auditory Performance (CAP) scores, Speech Intelligibility Rating (SIR) scores, and also Meaningful Auditory-Integration Scale (MAIS scores were compared at 6 months and 12 months post-implantation. **Results:** G roup I had 32 males and 20 females and group II had 27 males and 25 females. In group I and group II, CAP score >4 pre-implantation was seen in 10%and 17%, at 6 monthswas seen in 45% and 67% and at 12 months was seen in 78% and 90% in group I and II respectively. SIR score >4 pre-implantation was seen in 15% and in 24%, at 6 months was seen in 65% and in 70%, at 12 months in 72% and 88% in group I and II respectively. MAIS score >30 pre-implantation was seen in 7% and 11%, at 6 months in 36% and 40% and at 12 months in 69% and 84% in group I and II respectively. The difference was significant (P< 0.05). **Conclusion:** Children with multiple disabilities who have received cochlear implantation require intensive rehabilitation, where their unique needs are met on an individual basis and maximized for the greatest result.

Keywords: Children, cochlear implantation, deafness

INTRODUCTION

Children who have hearing loss may experience severe consequences for their speech and language development, leading to a double tragedy where they completely lose their ability to communicate naturally.[1,2] Due to the fact that communication is essential to their survival and that they would need special developmental needs and post-implantation rehabilitation, children with multiple disabilities may experience even more negative consequences from hearing loss. It is hoped that deafness treatment would alleviate other problems to a greater degree.[3]

Today, it is acknowledged that cochlear implantation (CI) can significantly improve the quality of life for deaf children and their families, particularly for those with multiple disabilities. For these kids, CI is now a crucial component of their multihandicap therapy. Cochlear implants can be performed in children as young as 6 to 12 months, but the earlier the implantation, the better the outcomes, especially in terms of speech and language development.[4] Typically, cochlear implants are recommended for children with profound or severe sensorineural hearing loss (where the inner ear or auditory nerve is damaged and hearing aids won't be effective).The child must be otherwise healthy and have appropriate cognitive development to benefit from the implant.[5]Cochlear implantation can significantly improve speech perception, language development, and social integration for children with severe hearing loss.Success depends on various factors, including the child's age at implantation, the presence of any other disabilities, and the amount of support and therapy they receive after implantation.[6]The present study was study was conducted to assess outcomes of cochlear implantation in children with multiple disabilities.

MATERIALS & METHODS

The study was carried out on 104 deaf children of both genders. All parents gave their written consent to

participate in the study.

Data such as name, age, gender etc. was recorded. Patients were divided into 2 groups of 52 each. Group I comprised of 52 deaf children with multiple disabilities and group II were deaf children without any additional disabilities. All children underwent cochlear implantation. Category of Auditory Performance (CAP) scores, Speech Intelligibility Rating (SIR) scores, and also Meaningful Auditory-Integration Scale (MAIS scores were compared at 6 months and 12 months post-implantation. Results thus obtained were subjected to statistical analysis. P value < 0.05 was considered significant.

RESULTS

Table I Distribution of patients

Groups	Group I (52)	Group II (52)
M:F	32:20	27:25

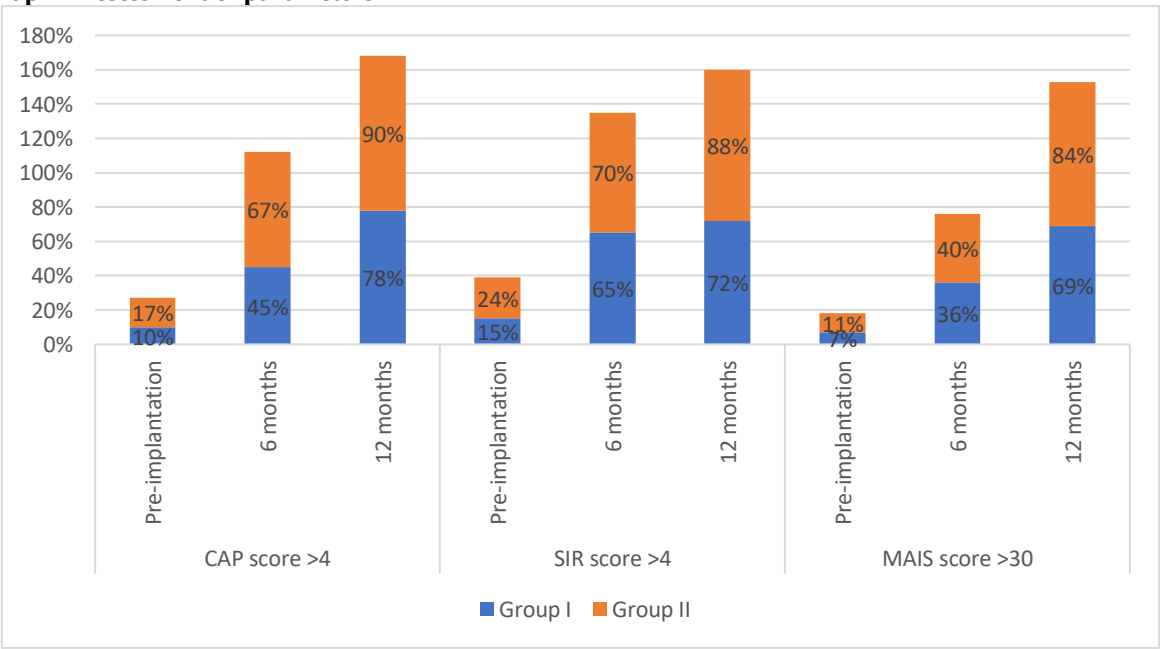
Table I shows that group I had 32 males and 20 females and group II had 27 males and 25 females.

Table II Assessment of parameters

Parameters	Variables	Group I	Group II	P value
CAP score>4	Pre-implantation	10%	17%	0.01
	6 months	45%	67%	
	12 months	78%	90%	
SIR score>4	Pre-implantation	15%	24%	0.04
	6 months	65%	70%	
	12 months	72%	88%	
MAIS score>30	Pre-implantation	7%	11%	0.05
	6 months	36%	40%	
	12 months	69%	84%	

Table II, graph I shows that in group I and group II, CAP score >4 pre-implantation was seen in 10% and 17%, at 6 months was seen in 45% and 67% and at 12 months was seen in 78% and 90% in group I and II respectively. SIR score >4 pre-implantation was seen in 15% and in 24%, at 6 months was seen in 65% and in 70%, at 12 months in 72% and 88%in group I and II respectively.MAIS score >30 pre-implantation was seen in 7% and 11%, at 6 months in 36% and 40% and at 12 months in 69% and 84%in group I and II respectively.The difference was significant (P< 0.05).

Graph I Assessment of parameters



DISCUSSION

The procedure involves placing the implant under the skin behind the ear and inserting an electrode array into the cochlea (the inner ear).[7] This surgery is generally done under general anesthesia and typically takes a few hours.After surgery, the child will need time to heal, usually a few weeks before the device can be activated.Once the device is healed and activated, a process called "mapping" takes place. During mapping, audiologists calibrate the implant to

the child's hearing thresholds, so the device can deliver sound at the right levels.[8]The child will need follow-up visits for adjustments as they grow and their hearing needs change.[9]After implantation, children usually need speech and auditory therapy to help them adjust to the new sounds. This process is vital for maximizing the benefits of the cochlear implant.With early implantation and consistent therapy, many children develop language skills similar to those of their hearing peers.[10]The present study was study was conducted to assess outcomes of cochlear implantation in children with multiple disabilities.

We found that group I had 32 males and 20 females and group II had 27 males and 25 females. Ganesh et al[11] conducted a retrospective cohort study on children with and without multiple handicaps who have received cochlear implantation at the cochlear implant clinic. Category of Auditory Performance (CAP) scores, Speech Intelligibility Rating (SIR) scores, and also Meaningful Auditory-Integration Scale (MAIS) and Meaningful Use of Speech Scale (MUSS) scores were compared at set time frequencies of 6 months and 12 months post-implantation between the two groups of implanted children. Results All the four CAP, SIR, MAIS and MUSS scores showed improvement over time with auditory and speech therapy in both groups of children as reflected by the improvement in their quality of life. The normative group of implantees showed better improvement compared to the group of children with multiple disabilities

We found that in group I and group II, CAP score >4 pre-implantation was seen in 10% and 17%, at 6 monthswas seen in 45% and 67% and at 12 months was seen in 78% and 90% in group I and II respectively. SIR score >4 pre-implantation was seen in 15% and in 24%, at 6 months was seen in 65% and in 70%, at 12 months in 72% and 88% in group I and II respectively. MAIS score >30 pre-implantation was seen in 7% and 11%, at 6 months in 36% and 40% and at 12 months in 69% and 84% in group I and II respectively. Nikolopoulos et al[12]studied the five-years post-implantation speech intelligibility in implanted children with multiple disabilities and compared it to a normative cohort of implantees. In this study, 70% of implantees with multiple disabilities achieved a SIR score of between 3 and 5 compared to 96% of the control group who achieved the same score. However, only 16% of implantees with disabilities achieved a SIR score of 4 or 5 compared to 61% of the normative cohort. This showed that multihandicapped children benefitted from CI although they did not achieve a high quality of speech, but nevertheless they are still understood in terms of speech perception

The shortcoming of the study is small sample size.

CONCLUSION

Authors found that children with multiple disabilities who have received cochlear implantation require intensive rehabilitation, where their unique needs are met on an individual basis and maximized for the greatest result.

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