Available online at www.sciencedirect.com
ScienceDirect
American Journal of Otolaryngology–Head and Neck Medicine and Surgery 31 (2010) 418–423
American Journal of OTOLARYNGOLOGY
www.elsevier.com/locate/amjoto

Cochlear implantation in late-implanted adults with prelingual deafness

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Received 7 May 2009

Abstract

Purpose: The purpose of this study was to examine the effect of cochlear implantation (CI) on prelingually deafened participants who were implanted as adults. The effect of the CI was examined with regard to the following variables: communication, family, social skills, education, and work satisfaction with one's life, loneliness, and self-esteem.
Materials and methods: Thirty-eight adults participated. Four self-report questionnaires were used at 2 points in time: before and after CI.
Results: The research findings show significant differences in the reports of most variables before and after implantation. The participants felt better with regard to communication, social skills, education, and work and satisfaction with one's life after implantation in comparison to their feelings before implantation. Furthermore, they felt less lonely after implantation. However, there were no significant differences before and after implantation regarding their feelings within the family and regarding their self-esteem.
Conclusions: The results demonstrated the need to evaluate the benefits resulting from the CI not only with traditional clinical measures but with additional measures as well. Furthermore, they demonstrated the benefit of the CI on the positive psychosociological implications of prelingually deafened adults.

1. Introduction

Cochlear implantation (CI) is an accepted and recommended option for auditory rehabilitation of postlingually deafened children and adults as well as children with prelingual deafness [1-4]. The results of many studies support the notion that, in general, with prelingually deafened children, better performance is achieved when the children are younger at implantation and the duration of deafness is shorter [5-7].

Candidacy criteria for CI have traditionally excluded older children and adolescents with prelingual hearing loss. The exclusion of these candidates was due to the concerns that after many years of auditory deprivation and lack of adequate auditory memory, the brain might not be capable of acquiring the processing abilities needed to benefit from CI [8,9]. In recent years, however, as a result of improvements in CI technology, candidacy for implantation has broadened to include older children with prelingual deafness [10-13].

In the recent decade, more research has focused on participants with prelingual profound hearing loss who underwent relatively late implantation (at 8 years or older) [12-15]. The results demonstrated that in comparison to prelingually deafened children who were implanted at a young age, the reports of those who were implanted at a later age were poorer. However, the results also demonstrated that within this latter group of participants implanted at a later age, there might be an improvement in the perception of speech after implantation in comparison to preimplantation results [10,12,13,15-17]. Thus, it became evident that speech understanding can improve after implantation at least in some adolescents and adults with prelingual hearing loss [17,18]. For example, Schramm et al [12] reported that at least some late-implanted individuals with prelingual deafness were able to achieve significant open-set speech

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doi:10.1016/j.amjoto.2009.07.002

understanding with CI. In this study, the participants demonstrated a wide range of performance. The results ranged from 0% to 74% for words and 0% to 98% for sentences. However, according to Schramm et al [12], 40% of the participants showed substantial gains in open-set speech recognition.

Most studies that have investigated CI use by prelingually deafened adults have focused on the results of clinical tests using behavioral measures of speech perception. Only few studies have dealt with the impact of CI on the quality of life of prelingually deafened adults who underwent implantation at a later stage. The results of these studies showed that even when there is no obvious gain in the clinical measures, participants reported satisfaction from their CI. For example, in the study by Schramm et al [12] cited above, the researchers claimed that all 15 participants in their study continued to use and report benefit from their cochlear implant.

Zwolan et al [18] also assessed the benefit of CI in 12 prelingually deaf adults who were implanted late through the use of speech perception measures and self-report questionnaires. The researchers found that although the participants showed little or no improvement in speech recognition skills, they used their device regularly and they reported on improved expressive and receptive communication skills. They also reported on satisfaction with their devices. These researchers suggested that procedures other than traditional speech recognition measures should be used to evaluate the benefit of a cochlear implant. In a later study by Peasgood et al [19], 10 early-deafened late-implanted individuals were examined. The benefit the implantation had on quality of life as well as various speech perception performances was assessed. They found that the adults demonstrated measured benefit in quality of life but did not demonstrate an improvement in performance on speech perception tasks. They concluded that factors other than auditory performance may be equally important from the individual's perspective and that some who might be considered poor candidates for CI under the traditional measures of candidacy may still derive considerable benefit from this procedure. Therefore, benefit and performance should be viewed as 2 separate outcomes in this population.

All of the studies cited above that examined the participants' satisfaction from the CI based their results on small samples. Zwolan et al [18] reported on 12 participants, Schramm et al [12] reported on 15 participants, and Peasgood et al [19] reported on 10 individuals. Therefore, the purpose of the present research was to assess the satisfaction from their CI of a larger sample of deafened adults than the sample that was used in the studies listed above. Most of the adults were prelingually deaf, and all of them underwent the CI intervention as adults. The satisfaction of the participants was assessed regarding the impact the CI had on the following variables: communication, family relations, social skills, education, and work. In addition, their self-esteem and sense of loneliness were examined. The reports considered the above variables before and after implantation.

2. Methods

2.1. Participants

Thirty-eight adults (12 males and 26 females), ages 19 to 71 years (mean ± SD, 36.61 ± 12.7) participated in the study. All the participants had severe-profound hearing loss. Thirty-one of the participants were prelingually deaf, 7 other participants became deaf by age 10 years. All the participants were implanted at a later stage of their life between the ages of 16 and 70 (mean ± SD, 33.58 ± 13.01). Most of the participants had at least 6 months of usage experience with the implant. Thirty-two participants used spoken language, and 6 used simultaneous communication (spoken language + signs). Fifteen of the participants were married, and the rest were either singles, divorced, or widowers. Twenty of the participants had children. Thirty-two of the participants reported having both hearing and deaf friends, whereas 5 had only hearing friends. Twenty-nine participants were employed.

2.2. Instruments

The research used 4 self-reporting questionnaires: (1) a personal background questionnaire; (2) a questionnaire examining the individual's satisfaction regarding communication, family climate, social skills, education, and work and general satisfaction with one's life; (3) a self-esteem questionnaire; and (4) a loneliness questionnaire.

2.3. Background information questionnaire

The background information questionnaire contained demographic details including the participant's age, sex, type and degree of hearing loss, age of implantation, duration of use of CI, mode of communication, and work and academic experience. This questionnaire included a few open questions regarding the CI intervention. The questions addressed why the person decided to go through the implantation, what were the expectations, and whether he/she is satisfied.

2.4. Performance and satisfaction scale

This questionnaire was adapted from a questionnaire that examined attitudes toward CI with regard to different domains such as communication, family climate, social skills, academic performance ethics, and others [20]. The original questionnaire was used in previous studies to examine attitudes of adolescents with hearing loss [20]. For the purpose of the current study, 25 items from the original questionnaire were used. The other 26 items were deleted, and instead, 10 new items were added. This adaptation was used so that the questionnaire would be more suitable for older participants with hearing loss. For