Unilateral Cochlear Implant: Impact on Quality of Life Measured With the Glasgow Benefit Inventory

Hosam A. Amodi, MD, Adrienne Wong, MD, Joseph M. Chen, MD, Julian M. Nedezleski, MD, and Vincent Y.W. Lin, M.D.
Department of Otolaryngology-Head & Neck Surgery, Sunnybrook Health Sciences Centre, Toronto, Ontario, Canada
Faculty of Medicine, University of Toronto, Toronto, Ontario, Canada

Objective: Cochlear implantation is now the standard of care in patients with profound SNHL. This study uses the validated Glasgow Benefit Inventory (GBI) to quantify the changes in quality of life (QOL) in adult cochlear implant (CI) users.

Methods: A total of 224 post-lingually deafened adult patients with unilateral CI who completed the GBI questionnaire were enrolled in the study. The mean patient age was 59.8 years (21-87 years old). The GBI was used to quantify the health benefits of CI. For subgroup analysis, the patients were divided into three groups according to their age at implantation: Group I consisted of 77 patients (< 55 yrs.); group II consisted of 80 patients (55-69 yrs.); and group III consisted of 67 patients (> 70 yrs.). The GBI scores were correlated with a 12-months post-implantation Hearing in Noise Test (HINT) and change in HINT scores.

Results: There were significant improvements in the total score (+39.77), general health (+53.35) and social (+23.36) scores of the GBI. The improvement in physical scores was not significant (+1.86). Although there were some differences in the improvements noted among the different age groups, they did not reach statistical significance, except in general health between group II and III (P = 0.004). In addition, the GBI total and general health scores correlated significantly with post-implantation HINT and change in HINT scores.

Conclusions: A majority of patients (94%) reported overall improvement in QOL after unilateral cochlear implantation. These findings are consistent with those in the literature for CI and the benefits are exceeding other implantable otologic devises and prosthesis. This study also shows improvements in QOL among CI users with better post-implantation open-set sentence recognition performance. This study is the largest to demonstrate significant QOL benefit from unilateral CI as measured by the GBI. Moreover, it is unique in showing the differences in benefit among different age groups.

Materials and Methods

Patients

Two hundred and twenty-four adults (128 females, 96 males) were included in this study. All patients were implanted at the Sunnybrook Health Sciences Centre. The procedure was uncomplicated in all cases. The average age at implantation for the whole group was 59.8 (range, 21-87) years. The study population was divided into three groups based on age: a young age group (<55 years-old), a middle-age group (55-69 years-old) and an elderly group (>70 yrs.). Causes of deafness in the three groups were collected.

Quality of Life

QOL measured by means of the GBI (15-19). The GBI is a retrospective generic QOL questionnaire developed by Robinson et al. (15) to measure outcomes after otorhinolaryngologic procedures. Three domains are covered by 18 items: 12 related to general improvement; 3 to social improvement; and 3 to physical improvement. Responses can be given on a 5-point Likert scale. Scores range from -100 (maximum lack of benefit), 0 (no benefit), to +100 (maximum benefit).

Results

Quality of Life

Of all patients, 94% had a total GBI score higher than 0, indicating a benefit from the implant. Results of the GBI total score for the whole group show a mean of +39.77 (SD 22.39) following implantation. In the subgroup analysis no statistical significance was found between benefits obtained by elderly and the other two groups in total and subscale scores except in general health, where group II benefited higher than group III (P = 0.004). The GBI results obtained by the study population were compared with the GBI values achieved by middle ear devices and BAHAs reported in otology literature.

Discussion

In agreement with previously published reports, CI produced positive results on all GBI subscales as well as total scores. To our knowledge, our study is the largest single-center experience to date which supports previous findings that CI significantly improves QOL using GBI. The analysis of the total mean benefit as measured by the GBI shows that CI produces improvement in QOL in 94% of the patients. The results indicate that the general benefit was maximum, followed by social benefits. The least benefit was found in the physical subscale.

The older adults show subjective benefits on all GBI subscales, which indicates that the patients were experiencing benefits from their CIs. However, the elderly CI users reported less benefit in total and general scores than the whole group. Still, the mean scores of the GBI total and its subscale scores didn’t reach statistical significance between the three groups, except in general health between group II and III (P = 0.004)

A positive correlation was found between post-operative speech perception and total score of the GBI and its general health subscale score. Nevertheless, correlations between post-implantation speech perception and social and physical subscale scores were not significant.

Conclusion

Most were experiencing benefit that exceed the benefit achieved by other implantable otologic devices and prosthesis. In addition, our results suggest that cochlear implantation in elderly provides improvements in objective measures as well as subjective QOL comparable to those in younger adults.

References