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**Improvement in Cognitive Abilities and Quality of Life After
Cochlear Implantation in the Elderly**

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Date of submission: 30/6/2018.

This Report Submitted to Fulfill the Requirements for Basic Medical Science.

Abstract:

Hearing loss is a prevalent consequence of aging and poses special challenges for older adults. Particularly when superimposed on other age-related conditions, presbycusis (age-related hearing loss) places older adults at risk for social isolation and associated psychological and general health sequelae. The increasing cognitive demand of communication and the diminished sense of social connectedness can contribute to a feeling of poor health that worsens with advancing presbycusis. There is accumulating evidence of a potential role for cochlear implant in older adults with hearing loss. The purpose of this report is to evaluate, the effectiveness of CI (cochlear implant) in older adults presenting sensorineural hearing loss, using as indices audiological data and information from quality of life (QOL) questionnaires.

Introduction:

A **cochlear implant (CI)** is a surgically implanted electronic device that provides a sense of sound to a person who is profoundly deaf or severely hard of hearing in both ears, it is bypass the normal hearing process; they have a sound processor that resides on the outside of the skin (and generally worn behind the ear) which contains microphones, electronics, battery, and a coil which transmits a signal to the implant. The implant has a coil to receive signals, electronics, and an array of electrodes which is placed into the cochlea, which stimulate the cochlear nerve.¹

Hearing loss is associated with poorer cognitive function, rates of cognitive decline, and the risk of incident dementia. These associations may be mediated through social isolation and/or cognitive load, raising the possibility that hearing rehabilitative interventions could potentially mitigate these outcomes. Amplification through hearing aids is a mainstay of hearing rehabilitative therapy in the elderly. For these individuals, cochlear implants (CIs) can serve as a useful means of hearing rehabilitation.

Although the gains conferred by CIs are comparable between older and young patients, the rate of CI use in older adults who meet candidacy criteria is less than 5%. The reasons for low rates of CI use in older adults are likely multifactorial, and include lack of awareness, poor access to CI centers and concern for an increased likelihood of complications.

Cochlear implantation in elderly patients results in improvements in speech perception and cognitive abilities and positively influences their social activity and quality of life, and constitutes a very successful procedure of auditory rehabilitation, even for patients aged ≥ 70 years. In addition, elderly patients benefit from implantation, with reduced stress.^{2,3}

Discussion:

There are many studies support that cochlear implantation improves autonomy and the QoL (quality of life) in the elderly, sound recognition, speech recognition, confidence, daily life, social exchange, and emotional behavior ability at different degrees in the elderly. Cognitive functions and executive functions appear to benefit from implantation, also age should not be a limiting factor, and cochlear implantation can be proposed as an efficient treatment for severe-to-profound hearing loss in the elderly.

In this study the participants are Sixteen consecutive patients were included, from 65 to 80 years old, with postlingual severe-to-profound deafness.

They are Evaluated were conducted before and at 6 and 12 months after cochlear implant surgery. A monosyllabic word recognition test was used to measure speech perception. QoL was evaluated by the World Health Organization Quality of Life Assessment for elderly people; cognitive function was evaluated by the Mini-Mental

State Examination; depression was evaluated by the Hamilton Scale; autonomy was evaluated by the Instrumental activities of daily living.

So the result was Speech intelligibility evolved from 10% before surgery to 63% and 69% at 6 and 12 months after cochlear implant activation, respectively. QoL showed significant improvement in sensory abilities. The Mini-Mental State Examination evaluations remained stable and executive functions tended to improve. Autonomy improved significantly.⁴

Also the measured outcomes in second study included the quality of life, speech understanding, tinnitus distress, stress level, anxiety, and depressiveness. after cochlear implantation in Seventeen elderly patients (80 or older) with progressive bilateral deafening , was a significant improvement in hearing but also health-related quality of life, speech understanding, and tinnitus distress of the implanted patients. And the perceived stress, general anxiety, and depressiveness were low or normal prior and after surgery.⁵

In the last study 94 patients aged 65 to 85 years with profound, postlingual hearing loss who were evaluated before, 6 months after, and 12 months after cochlear implantation.

Speech perception was measured using disyllabic word recognition tests in quiet and in noise settings. Cognitive function was assessed using a battery of 6 tests evaluating attention, memory, orientation, executive function, mental flexibility, and fluency (Mini-Mental State Examination, 5-word test, clock-drawing test, verbal fluency test, d2 test of attention, and Trail Making test parts A and B). Quality of life and depression were evaluated using the Nijmegen Cochlear Implant Questionnaire and the Geriatric Depression Scale-4.

Cochlear implantation led to improvements in speech perception in quiet and in noise ,quality of life, and Geriatric Depression Scale-4 scores (76% of patients gave responses indicating no depression at 12 months after implantation vs 59% before implantation). Before cochlear implantation, 44% of the patients (40 of 91) had abnormal scores on 2 or 3 of 6 cognition tests. One year after implant, 81% of the group showed improved global cognitive function (no or 1 abnormal test score). Improved mean scores in all cognitive domains were observed as early as 6 months after cochlear implantation.

The effectiveness of the cochlear implantation in patients with severe hearing loss after 60 years of age with respect to the quality of life and hearing was confirmed. Statistically significant improvement was demonstrated in the self-assessment of patients in relation to the speech understanding, spatial hearing and quality of hearing, as well as quality of life.⁶

Conclusion:

This studies demonstrates a significant improvement in the quality of life and speech understanding in a group of elderly patients who underwent cochlear implantation. An additional positive indicator of a promising hearing rehabilitation was a significant improvement of the tinnitus distress. Perceived stress level, general anxiety, and the depressiveness of implanted patients were low and remained unaffected.

A broader conceptual framework than is currently available for the role of CI rehabilitation in the management of severe-to-profound hearing loss in older adults is proposed. It is posited that the use of such a model in future investigations is needed to guide multidisciplinary investigations into the unique challenges of hearing loss in older adults and may open new opportunities for innovation.

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