



ORIGINAL ARTICLE

Hearing preservation and cochlear implants according to inner ear approach: multicentric evaluation^{☆,☆☆}



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KEYWORDS

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Abstract

Introduction: Electroacoustic stimulation is an excellent option for people with residual hearing in the low frequencies, who obtain insufficient benefit with hearing aids. To be effective, the subject's residual hearing should be preserved during cochlear implant surgery.

Objectives: To evaluate the hearing preservation in patients that underwent implant placement and to compare the results in accordance with the approach to the inner ear.

Methods: 19 subjects underwent a soft surgical technique, and the electrode MED-EL FLEX™ EAS, designed to be atraumatic, was used. We evaluated pre- and postoperative tonal audiometric tests with an average of 18.4 months after implantation, to measure the rate of hearing preservation.

Results: 17 patients had total or partial preservation of residual hearing; 5 had total hearing preservation and two individuals had no preservation of hearing. The insertion of the electrode occurred through a cochleostomy in 3 patients, and in 2 of these there was no hearing preservation; the other 16 patients experienced electrode insertion through a round window approach. All patients benefited from the cochlear implant, even those who are only using electrical stimulation.

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Conclusion: The hearing preservation occurred in 89.4% of cases. There was no significant difference between the forms of inner ear approach.

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PALAVRAS-CHAVE

Implante coclear;
Orelha interna;
Correção de
deficiência auditiva;
Perda auditiva
bilateral

Preservação auditiva e implante coclear de acordo com a abordagem da orelha interna: avaliação multicêntrica

Resumo

Introdução: A estimulação eletroacústica é uma excelente opção para pessoas com audição residual nas baixas frequências, que obtêm benefício insuficiente com aparelhos auditivos. Para ser eficaz, a audição residual deve ser preservada durante a cirurgia de implante coclear.

Objetivos: Avaliar a preservação auditiva de pacientes implantados e comparar os resultados de acordo com a abordagem da orelha interna.

Método: 19 indivíduos foram implantados com uma técnica cirúrgica para preservação auditiva, tendo sido utilizado o eletrodo MED-EL FLEX™ EAS, concebido para ser atraumático. Foram avaliados os exames audiométricos tonais no pré e pós-operatório, com uma média de 18,4 meses após o implante para medir a taxa de preservação da audição residual.

Resultados: 17 pacientes tiveram preservação total ou parcial da audição residual; cinco obtiveram preservação da audição total e dois indivíduos não tiveram preservação da audição. A inserção do eletrodo ocorreu por cocleostomia em 3 pacientes; em 2 destes pacientes não houve preservação da audição. Os outros 16 pacientes foram submetidos à abordagem pela janela redonda. Todos os pacientes foram beneficiados com o implante coclear, mesmo aqueles pacientes que utilizando apenas estimulação elétrica.

Conclusão: A preservação auditiva ocorreu em 89,4% dos casos. Não houve diferença significativa entre as formas de abordagem da orelha interna.

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Introduction

Electroacoustic stimulation is an excellent option for people who have residual hearing at low frequencies, but not at high frequencies, and achieve insufficient benefits with the use of hearing aids. For an electroacoustic stimulation to be most effective, the patient's residual hearing should be preserved during cochlear implant (CI) surgery.

In recent decades, several electrodes were developed and refined in order to cause the least possible damage to the cochlear structures, thereby preserving residual hearing.¹⁻⁴ However, for the preservation to be successful, in addition to an appropriate electrode, a special surgical technique is essential. After the earliest operations, in which a conventional cochlear implant electrode was partially inserted into the cochlea,⁵ the so-called "soft surgery" was developed, striving for a less traumatic operation. This surgery aims to preserve hearing, and many advances have occurred since then.^{6,7}

The route for the introduction of the electrode into the cochlea is one facet of the surgical technique that has been especially studied and discussed.

Initially, insertion through the round window was the standard technique for hearing preservation surgery. This technique consists of a minimal incision through the

membrane, with no need for drilling the cochlea, thereby reducing acoustic trauma and the possibility of bone fragments entering the scala tympani.⁸

However, a recently published study showed that the angle of insertion of the electrode is similar for both techniques (through the round window and by cochleostomy), and in both procedures, tissue damage will be minimal if an electrode designed for hearing protection is used.⁹ In a systematic literature review in 2013 comparing the two approaches, we could not find a single study specifically comparing insertion techniques; the levels of hearing preservation were similar between the two approaches, being slightly higher in patients undergoing insertion through the round window.⁸

Currently, such data comprise the largest case series of patients who underwent the technique of hearing preservation in cochlear implantation in Latin America. Furthermore, this group of patients has also been benefited with a longer postoperative follow-up.

Considering the importance of a deeper understanding of the factors that contribute to a higher rate of hearing preservation in patients who undergo cochlear implant placement, this study aims to assess the rate of hearing preservation in these subjects, and compare the results and the auditory

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