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ORIGINAL ARTICLE

Preoperative vestibular assessment protocol of cochlear implant surgery: an analytical descriptive study[☆]

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KEYWORDS

Cochlear implant;
Vestibular function;
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Abstract

Introduction: Cochlear implants are undeniably an effective method for the recovery of hearing function in patients with hearing loss.

Objective: To describe the preoperative vestibular assessment protocol in subjects who will be submitted to cochlear implants.

Methods: Our institutional protocol provides the vestibular diagnosis through six simple tests: Romberg and Fukuda tests, assessment for spontaneous nystagmus, Head Impulse Test, evaluation for Head Shaking Nystagmus and caloric test.

Results: 21 patients were evaluated with a mean age of 42.75 ± 14.38 years. Only 28% of the sample had all normal test results. The presence of asymmetric vestibular information was documented through the caloric test in 32% of the sample and spontaneous nystagmus was an important clue for the diagnosis. Bilateral vestibular areflexia was present in four subjects, unilateral arreflexia in three and bilateral hyporeflexia in two. The Head Impulse Test was a significant indicator for the diagnosis of areflexia in the tested ear ($p = 0.0001$). The sensitized Romberg test using a foam pad was able to diagnose severe vestibular function impairment ($p = 0.003$).

Conclusion: The six clinical tests were able to identify the presence or absence of vestibular function and function asymmetry between the ears of the same individual.

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PALAVRAS-CHAVE

Implante coclear;
Função vestibular;
Diagnóstico
pré-operatório

Protocolo de avaliação vestibular pré-operatória da cirurgia de implante coclear: estudo descritivo analítico

Resumo

Introdução: Os Implantes Cocleares (IC) são indiscutivelmente um método eficaz de recuperação da função auditiva de pacientes surdos.

Objetivo: Descrever o protocolo de avaliação vestibular pré-operatória em sujeitos que serão submetidos ao IC.

Método: Nosso protocolo institucional prevê o diagnóstico vestibular por meio de seis testes simples: testes de Romberg e Fukuda, nistagmo espontâneo, *Head Impulse Test*, *Head Shaking Nistagmus*, prova calórica.

Resultados: Foram avaliados 21 pacientes com idade média de $42,75 \pm 14,38$ anos. Apenas 28% da amostra apresentou todos os testes normais. A presença de informação vestibular assimétrica foi documentada pela prova calórica em 32% da amostra e o nistagmo espontâneo mostrou-se pista importante para seu diagnóstico. A arreflexia vestibular bilateral foi diagnosticada em quatro sujeitos; arreflexia unilateral em três e hiporreflexia bilateral em dois. O *Head Impulse Test* mostrou-se indicador significativo ($p=0,0001$) para diagnosticar arreflexia da orelha testada. O teste de Romberg sensibilizado em almofada foi capaz de diagnosticar os comprometimentos severos da função vestibular ($p=0,003$).

Conclusão: Os seis testes clínicos foram capazes de identificar a presença ou não de função vestibular e assimetria da função entre as orelhas de um mesmo indivíduo.

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Introduction

Cochlear implants (CI) are highly effective devices for recovery of hearing function in individuals with hearing loss and have facilitated integration into social life. The success of post-implant rehabilitation has raised new challenges in both the selection and the planning of the hearing prognosis of subjects undergoing surgery. Although the cochlear system is distinct from the vestibular system, both have identical neural transmission. The benefits of the electrical stimulation of the CI go beyond the auditory pathways and also benefit the vestibular system and postural control.¹ Nonetheless, the CI is not without risk to the semicircular canal and otolith function and may impair or suppress vestibular function, especially if there is pre-existing pathology.

The prevalence of postoperative dizziness varies widely in the literature and is around 20% in our cases. It usually resolves in approximately 30 days. Some of these patients develop bilateral vestibular areflexia (BVA), which severely reduces patient quality of life.² Knowledge of vestibular system function before and after CI surgery is important for the satisfactory management of each case. Therefore, we have added vestibular assessment to our outpatient routine prior to CI surgery. Our main goal is to document the existence of vestibular function and possible asymmetries between the ears before surgery. This information can help in the selection of which ear to implant and can assist in the management of any postoperative vestibular symptoms.

In adults, preoperative vestibular assessment was designed to be brief and easy to perform, using resources available at any otorhinolaryngology outpatient clinic. The

tests used are able to identify both vestibular asymmetry from unilateral lesions as well as bilateral involvement. The protocol was designed to be accessible to services that perform CI surgery but do not always have a neurotological department and research equipment.

It is not our intention to speak at length about each vestibular test used, but to provide the reader a quick and convenient method to identify vestibular impairment. Knowledge of vestibular function can indicate the adequate management and prevent undesirable side effects.^{3,4}

Objective

Our goal is to describe the preoperative vestibular assessment of adult patients who are cochlear implant candidates in our institution, demonstrate its effectiveness and discuss its importance in the postoperative outcome.

Methods

This is a descriptive and analytical cross-sectional study that followed the ethical standards approved by the CAEPesq number 0983.07. All participants are from the Institution Otorhinolaryngology Clinic.

Our sample comprises 21 subjects, 10 men and 11 women, mean age of 46 ± 14.74 years who agreed to participate in the study. All adults previously selected for CI surgery, admitted between May 2013 and November 2014 were included in the sample. All patients were capable of understanding and performing the necessary examinations for the preoperative vestibular diagnosis. The assessment includes

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