



ORIGINAL ARTICLE

Extratympanic Electrocochleography in Ménière's Disease[☆]

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KEYWORDS

Extratympanic electrocochleography;
Ménière's disease;
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Abstract

Introduction: Electrocochleography is the registration of an electrophysiological event which takes place in the cochlea after an acoustical stimulus. Most of the authors consider an increased summing potential (SP)/action potential (AP) ratio as characteristic of endolymphatic hydrops.

Methods: A longitudinal, prospective study of a unilateral Ménière's population diagnosed according to the American Academy of Otolaryngology–Head and Neck Surgery classification was carried out. A complete clinical history and bedside examination were performed, in addition to complete auditory and vestibular testing and an extratympanic electrocochleography. We selected 20 normal hearing subjects with no history of vestibular and otological pathology as a control group.

Results: Of the 100 patients included in the study, 62 were diagnosed as definite Ménière's disease, and 13 and 25 as probable and possible Ménière's disease, respectively. In the electrocochleography, 85% of all the patients had an SP/AP ratio above 0.5. A sensibility of 92%, 78% and 75% was obtained in the definite, probable and possible Ménière's disease patients, respectively.

Discussion and conclusions: Electrocochleography is a useful method for diagnosing and evaluating patients with Ménière's disease syndrome. It provides information about the progression of the process and shows a significant correlation with the clinical stage.

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PALABRAS CLAVE

Electrococleografía extratimpánica;
Enfermedad de Ménière;
Pruebas vestibulares

Electrococleografía extratimpánica en la enfermedad de Ménière

Resumen

Introducción: La electrococleografía (ECoG) es un registro de un episodio electrofisiológico, que tiene lugar en la cóclea tras un estímulo acústico. La mayoría de los autores consideran que un aumento del cociente SP/AP utilizando clicks, es característico del hidrops.

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Métodos: Presentamos un estudio longitudinal y prospectivo de una población de pacientes con enfermedad de Ménière unilateral definida según los criterios de la Academia Americana de Otorrinolaringología y patología cervicofacial. Tras una correcta anamnesis y exploración otoneurológica completa, todos los pacientes fueron sometidos a un estudio de la función auditiva y vestibular mediante audiometría tonal liminar, pruebas calóricas, rotatorias y una ECoG extratimpánica. Como controles se escogieron 20 sujetos normoacúsicos carentes de antecedentes de afección vestibular u otológica, ni antecedentes quirúrgicos en el oído medio.

Resultados: De los 100 pacientes incluidos, 62 fueron diagnosticados de enfermedad de Ménière definida, 13 de probable y 25 de enfermedad de Ménière posible. Un 85% de la población con enfermedad de Ménière, cumplían criterios electrofisiológicos de enfermedad de Ménière según los parámetros de la ECoG (SP/AP > 0,5). El porcentaje de ECoG alteradas según el diagnóstico era del 92, 78 y 75% para el Ménière definido, probable y posible respectivamente.

Discusión y conclusiones: La ECoG es un método útil para el diagnóstico y evaluación de la enfermedad de Ménière. Aporta información fidedigna del progreso de la enfermedad y existe correlación con su estadio diagnóstico.

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Introduction

As the term itself suggests, electrocochleography (ECoG) is a recording of an electrophysiological episode occurring within the cochlea after acoustic stimulation.

Far from being a new technique, ECoG emerged as a clinical tool in the 1970s, although the first attempts to record the cochlear microphonic potential date from 1930, when this potential was discovered in cats.

Subsequently, the summation potential (SP) was described in animals in 1950, but the first record in humans was not obtained until the decade of the 1970s by Eggermont and Odenthal¹ and Gibson et al.²

The discovery of the clinical applications of brainstem auditory evoked potentials (BAEP) increased the interest in all auditory evoked potentials. This fact, coupled with the development of noninvasive techniques, facilitated the implementation of ECoG as a method of study in many Otorhinolaryngology services and units.³

The indications for study by ECoG are not limited to the study of endolymphatic hydrops/Ménière's disease, as it can also have clinical applications as an auditory study in the paediatric population or for intraoperative monitoring, among others.

The 2 approaches currently available for ECoG recording are the transtympanic and the extratympanic.

Its ease of use, low morbidity and, in most cases, unnecessary presence of a physician, have contributed to the growing presence of extratympanic ECoG in various diagnostic protocols.⁴

It is a proven fact that patients with Ménière's disease usually develop increased SP amplitudes. This is because the increased endolymphatic volume creates an impairment for the vibration capacity of the organ of Corti, to which the SP is sensitive.

Although this finding is frequent, its applicability is greatly reduced by its low specificity, since the values obtained largely overlap with those of the normal population. However, thanks to the relationship established between the SP parameter and the action potential (AP), the diagnostic performance of the test has increased significantly, thus improving its development as a clinical tool.²

In fact, at present most authors believe that an increase in the SP/AP ratio using clicks is characteristic of hydrops.

In an attempt to improve the sensitivity of the test for the diagnosis of Ménière's disease, Devaiah et al.⁵ not only measured the SP/AP ratio, but also the SP/AP area, thereby increasing the sensitivity of the test, according to the author.

In our study we aimed to assess the sensitivity and specificity of ECoG in our population of patients with Ménière's disease and to correlate it with parameters obtained through clinical and vestibular studies.

Material and Methods

We present a prospective and longitudinal study of a population of patients with unilateral Ménière's disease, defined according to the criteria of the American Academy of Otolaryngology-Head and Neck Surgery (AAO-HNS).

The study was conducted between March 2008 and February 2011.

We consecutively studied all patients attending the Otoneurology Service during the study period who met the inclusion criteria.

After a correct anamnesis and complete otoneurological examination, all patients underwent a study of auditory and vestibular function through liminal tone audiometry, caloric and rotational testing and extratympanic ECoG.

Inclusion Criteria

- 1 Patients with unilateral Ménière's disease, classified as definite, probable or possible according to the criteria of the AAO-HNS.
- 2 Correct completion and interpretation of all auditory, vestibular and electrophysiological tests necessary for this study.
- 3 Normoacusis of the contralateral ear.

Exclusion Criteria

- 1 Bilateral involvement or presence of symptoms suggesting involvement of the contralateral ear.
- 2 Symptoms suggestive of the presence of neurological involvement.

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