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REVIEW ARTICLE

Study of cochlear microphonic potentials in auditory neuropathy☆

Ilka do Amaral Soares[a,b,*], Pedro de Lemos Menezes[b,c], Aline Tenório Lins Carnaúba[a], Kelly Cristina Lira de Andrade[a], Otávio Gomes Lins[d,e]

[a] *Medical Sciences, Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil*
[b] *Universidade Estadual de Ciências da Saúde de Alagoas, Maceió, AL, Brazil*
[c] *Universidade de São Paulo (USP), São Paulo, SP, Brazil*
[d] *Universidade Federal de São Paulo (UNIFESP), São Paulo, SP, Brazil*
[e] *Universidade Federal de Pernambuco (UFPE), Recife, PE, Brazil*

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KEYWORDS
Cochlear microphonic;
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Abstract
Introduction: Auditory Neuropathy/Dyssynchrony is a disorder characterized by the presence of Otoacoustic Emissions and Cochlear Microphonic Potentials, an absence or severe alteration of Brainstem Evoked Auditory Potential, auditory thresholds incompatible with speech thresholds and altered acoustic reflexes. The study of the Cochlear Microphonic Potential appears to be the most important tool for an accurate diagnosis of this pathology.
Objective: Determine the characteristics of the Cochlear Microphonic in Auditory Neuropathy/Dyssynchrony using an integrative review.
Methods: Bibliographic survey of Pubmed and Bireme platforms and MedLine, LILACS and SciELO data banks, with standardized searches up to July 2014, using keywords. Criteria were established for the selection and assessment of the scientific studies surveyed, considering the following aspects: author, year/place, degree of recommendation/level of scientific evidence, objective, sample, age range, mean age, tests, results and conclusion.
Results: Of the 1959 articles found, 1914 were excluded for the title, 20 for the abstract, 9 for the text of the article, 2 for being repeated and 14 were selected for the study.
Conclusion: The presence of the Cochlear Microphonic is a determining finding in the differential diagnosis of Auditory Neuropathy/Dyssynchrony. The protocol for the determination of Cochlear Microphonic must include the use of insert earphones, reverse polarity and blocking

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* Corresponding author.
E-mail: ilkaamaralsoares@gmail.com (I.d.A. Soares).

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the stimulus tube to eliminate electrical artifact interference. The amplitude of the Cochlear Microphonic in Auditory Neuropathy/Dyssynchrony shows no significant difference from that of normal individuals. The duration of the Cochlear Microphonic is longer in individuals with Auditory Neuropathy/Dyssynchrony.

PALAVRAS-CHAVE
Microfonismo coclear;
Potencial microfônico coclear;
Perda auditiva

Estudo do microfonismo coclear na neuropatia auditiva

Resumo
Introdução: A Neuropatia/Dessincronia Auditiva é uma doença caracterizada pela presença das Emissões Otoacústicas e do Microfonismo Coclear, com ausência ou grave alteração do Potencial Evocado Auditivo de Tronco Encefálico, limiares auditivos incompatíveis com limiares vocais e reflexos acústicos alterados. O estudo do Microfonismo Coclear parece ser a ferramenta mais importante para um diagnóstico preciso desta patologia.
Objetivo: Verificar por meio de uma revisão integrativa as características do Microfonismo Coclear na Neuropatia/Dessincronia Auditiva.
Método: Levantamento bibliográfico nas plataformas Pubmed e Bireme e nas bases de dados MedLine, LILACS e SciELO, com buscas padronizadas até julho de 2014, utilizando-se palavras-chave. Para a seleção e avaliação dos estudos científicos levantados, foram estabelecidos critérios, contemplando os aspectos: autor, ano/local, grau de recomendação/nível de evidência científica, objetivo, amostra, faixa etária, média de idade em anos, testes, resultados e conclusão.
Resultados: Dos 1959 artigos encontrados, 1914 foram excluídos pelo título, 20 pelo resumo, nove pela leitura do artigo, dois eram repetidos e 14 foram selecionados para o estudo.
Conclusão: A presença do Microfonismo Coclear é um achado determinante no diagnóstico diferencial da Neuropatia/Dessincronia auditiva. O protocolo de registro do Microfonismo Coclear deve contar com o uso de fones de inserção, a inversão da polaridade e o bloqueio do tubo do estímulo para impedir a interferência de artefato elétrico. A amplitude do Microfonismo Coclear na Neuropatia/Dessincronia auditiva não apresenta diferença significante entre a amplitude do Microfonismo Coclear em ouvintes normais. A duração do Microfonismo Coclear é maior em indivíduos com Neuropatia/Dessincronia auditiva.

Introduction

The term auditory neuropathy (AN) was first used in 1996 to define a group of individuals with auditory symptoms, who had in common normal cochlear function despite having abnormal cochlear nerve function. Moreover, they experienced difficulty in understanding speech especially in noisy environments, although in some cases they responded to sound stimuli.[1] Today the most common denomination is auditory neuropathy/dyssynchrony (AN/AD).

In general findings reveal the absence or severe abnormality of the Auditory Brainstem Response (ABR) with preservation of the otoacoustic emissions (OAE) and/or the Cochlear Microphonic (CM), indicating disordered function of the auditory nerve with normal function of the cochlear hair cells (HC).[1–4]

It is often difficult to determine exactly the onset of AN/AD, but the disease can occur at all ages.[4] Its prevalence has been estimated at 11% in a group of 109 hearing-impaired children who failed the newborn hearing screening (NHS) and ABR.[5] Another study reports a similar prevalence of 8.44% in 379 children evaluated with ABR alteration.[4]

The CM is a potential generated from the outer hair cells (OHC) and inner hair cells (IHC) of the cochlea and its absence is consistent with alterations in the function of these cells.[2,6] It is an electrical activity that precedes the synapses of the HC with the auditory nerve and, therefore, when recorded, it appears before wave I on ABR and maintains its latency even when the stimulus intensity is decreased.[5]

There are still no available data regarding CM parameters in individuals with normal hearing or with hearing loss. However, recording the CM attracted renewed interest after the identification of the AN/AD,[1] as the association between the cochlea and an acoustic stimulation has been used in the differential diagnosis of AN/AD, once the presence of CM can be used as evidence of OHC integrity.[7]