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Associations of light-adapted electroretinogram in pediatric amblyopia

Ophthalmic and Physiological Optics

First published: 03 December 2024

https://doi.org/10.1111/opo.13430

Abstract

Purpose

The aim of this study was to investigate changes in the light-adapted (LA) electroretinogram (ERG) associated with pediatric amblyopia.

Method

A total of 220 eyes from 81 postoperative pediatric cataract patients and 29 healthy children were enrolled in four groups, namely controls, unilaterally amblyopic eyes, non-amblyopic fellow eyes and bilaterally affected eyes. Differences in LA ERG variables (peak time and amplitude of a- and b-waves and photopic negative response [PhNR]) were compared across groups, as well as their associations with visual acuity and changes in axial length.

Results

The peak time of both the a-wave ($p < 0.001$) and b-wave ($p < 0.001$), as well as the amplitude of the b-wave ($p < 0.001$) and the PhNR ($p = 0.04$) differed significantly across groups. Compared to controls, affected eyes in both unilateral and bilateral groups showed significantly lower b-wave amplitude and longer a- and b-wave peak times ($p < 0.008$, Bonferroni-corrected). Additionally, fellow eyes in the unilateral group exhibited significantly longer b-wave peak times ($p = 0.008$). For all eyes, poorer visual acuity was associated with a longer peak time for both the a- ($p = 0.006$) and b-waves ($p = 0.003$), as well as lower amplitudes of the b-wave ($p = 0.006$) and PhNR ($p = 0.02$).

Conclusions

Changes in LA ERG components suggest alteration of retinal physiology in deprivation amblyopia. Thus, the LA ERG may provide additional information to help understand the mechanisms underlying deprivation amblyopia.