Editorial

Electroretinography and Rhegmatogenous Retinal Detachment

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Electroretinography (ERG) is commonly used to assess the physiological status of the retina. It has been extensively studied in inherited retinal and choroidal diseases, and is a main paraclinical examination in the diagnosis and follow-up of patients affected by retinal and choroidal dystrophies.[1-3] Other possible clinical applications of ERG include, but are not limited to, assessing the toxicity of ocular drugs[4] and evaluating the potential for vision in blind eyes.[5]

Few studies have evaluated the role of retinal electrophysiology testing in patients with retinal detachment and after retinal reattachment surgery using full-field[6] and multifocal[7] ERG. Both animal and human studies have shown that retinal detachment causes the loss of the outer segments of photoreceptor cells.[8,9] Both cone and rod photoreceptors are affected in retinal detachment. However, the magnitude of the damage and its likely location in the retina are not clearly known.

In this issue of the *Journal of Ophthalmic and Vision Research*, Lin et al[10] report ERG findings in eyes with rhegmatogenous retinal detachment (RRD) before surgery. The authors found that eyes with RRD had significant decreases in a and b wave amplitudes of both rod and cone responses when compared to fellow normal eyes. Interestingly, the magnitude of change was similar for dark and light adapted responses. The results of the above study indicate that in RRD, outer retinal dysfunction equally affects the rods and cones, and is accompanied by inner retinal dysfunction. This study is unique in that the ERG testing was performed on both photopic and scotopic components before any surgical intervention.

Kim et al[1] have reported changes in scotopic ERG in patients with RRD before surgery. They reported that the amplitudes of scotopic a and b waves were significantly decreased in the eye with detached retina when compared to fellow normal eyes. The amplitudes improved after successful surgery. Hayashi and Yamamoto[11] evaluated changes in short-wavelength (S), mixed long-wavelength (L), and middle-wavelength (M) sensitive cone ERG recordings before and after successful retinal detachment surgery. Before surgery, no significant difference was observed between the ratio of the S-cone ERG amplitudes and the ratios of the L and M-cone ERG amplitudes. Postoperatively, the ratios of the L- and M-cone ERGs increased significantly when compared to the preoperative values ($P = 0.001$). However, the ratio of the S-cone ERG did not improve. The authors concluded that impairments of the L- and M-cone system, but not the S-cone system, caused by retinal detachment may be reversible. Azarmina et al[12] reported that changes in photopic ERG occur faster than scotopic ERG after surgery in eyes affected with RRD. The authors showed that both scotopic and photopic ERG responses recovered after surgery. In addition, they showed that changes in b wave amplitude were significant. Although they did not report the recordings of fellow eyes, this finding is in line with that of Lin et al[10] indicating possible damage to the inner retinal layers in eyes with RRD.

Lin et al[10] did not observe any statistically significant differences in a or b wave latency at different flash intensities. This finding suggests that RRD may not affect signal transmission, at least early after RRD.

Our current knowledge of electrophysiological changes in RRD is limited and future studies regarding the application of ERG studies in eyes with RRD are needed. Although some studies have reported the prognostic value of ERG testing in eyes with RRD, the potential clinical applications of this technique are not clear.[13] Future large-scale studies may be helpful in further investigating the use of ERG testing for various aspects of retinal detachment, such as determination of the optimal time of intervention, the outcomes of different types of surgery, and effects of pharmacotherapeutics on surgery.

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