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Electrophysiological Evaluation of Macular Photoreceptor Functions in Patients with Choroidal Neovascular Membranes

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Purpose

To evaluate changes in cone functions using light-adapted (LA) 30 Hz flicker and LA 3.0 electroretinography (ERG) in intravitreal ranibizumab (IVR)-treated naïve neovascular age-related macular degeneration (nAMD) patients.

Materials and methods

This retrospective interventional study reviewed the medical records of 32 nAMD patients (32 eyes) who received monthly IVR between January 2019 and January 2021. A comprehensive ophthalmic examination, including best-corrected visual acuity (BCVA) testing and slit-lamp biomicroscopy, was performed as part of their clinical care, followed by LA 30 Hz flicker and LA 3.0 ERGs, optical coherence tomography, and fundus fluorescein angiography. All measurements were taken before IVR (baseline), as well as at months 6 and 12 later. Treatment was resumed for up to 12 months if recurrence occurred.

Results

Compared to baseline, visual acuity improved significantly at months 6 and 12, respectively, coinciding with a significant decrease in central macular thickness ($p < 0.05$ for all). LA 30 Hz flicker ERG b-wave amplitude decreased significantly between baseline and months 6 and 12, respectively ($p < 0.05$ for both). There were no significant changes in LA 3.0 ERG a- and b-wave amplitudes between baseline and month 6 ($p > 0.05$ for both), but a significant decrease existed between baseline and month 12 ($p < 0.05$ for both). While LA 3.0 ERG a-wave implicit time increased significantly ($p < 0.05$ for both) between baseline and months 6 and 12, respectively, b-wave implicit time did not ($p > 0.05$ for both). Also, LA 30 Hz flicker ERG b-wave implicit times did not differ significantly between baseline and months 6 and 12, respectively ($p > 0.05$, for both).

Conclusions

IVR was associated with long-term electrophysiological changes in cone functions, as measured by LA 30 Hz flicker and LA 3.0 ERGs.