学位論文の要旨

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主論文の題名

Effect of Pupil Size on Flicker ERGs Recorded With RET*eval* System: New Mydriasis-Free Full-Field ERG System

主論文の要旨

Background

The flicker electroretinograms (ERGs) are valuable for monitoring degenerative retinal disorder and for evaluating retinal ischemic status in diabetic retinopathy, central retinal vein occlusion, and other vascular disorders. Recently, a full-field flicker ERG recording system called the RET*eval* was developed. In RET*eval* system, a special skin electrode array are used, and the flicker ERG can be recorded without mydriasis. The RET*eval* manufacturer claims that the system delivers a constant flash illuminance by adjusting the flash luminance to compensate for changes in pupil size. However, the range of pupil sizes for which the retinal illuminance actually remains constant has not been specified.

Purpose

To study whether pupil sizes affect the flicker ERGs recorded by RET*eval*.

Methods

We studied 10 healthy subjects and perform two experiments. First, the flicker ERG was recorded every 3 minutes after the instillation of mydriatics. Second, the flicker ERG was recorded while the subjects wore soft contact lenses with two different artificial pupil sizes.

Results

The first experiment showed that as pupil size increased, the amplitude of the fundamental component of the flicker ERG did not change significantly, but the implicit times of the fundamental component were significantly prolonged for larger pupil size. There was a significant positive correlation between the pupillary area and implicit time of the fundamental component ($r=0.93$, $P<0.001$). The second experiment showed that the implicit times of the fundamental component in the flicker ERG were significantly longer with larger artificial pupil.

Conclusions

The results suggest that the effective retinal illuminance of the stimulus delivered by the RET*eval* system decreased for larger pupil sizes. However, in most clinical testing situations, patients' undilated pupils will likely be sufficiently small to fall within the range for which

the system delivers a stimulus of constant retinal illuminance.