New Handheld, Non-Mydriatic ERG Device to Screen for Diabetic Retinopathy and Other Eye Diseases

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Abstract

Purpose: To evaluate the use of a new 30 Hz RETeval® handheld ERG device in diabetic and glaucoma patients in the office setting.

Methods: RETeval® (LKC Technologies, Gaithersburg, MD) is a small handheld ERG device using adhesive skin electrodes a 30 Hz light stimulating 30-Hz flicker photoreceptors to elicit a photopic ERG response. Six patients with diabetes and nine glaucoma patients were evaluated with this new device. The 30 Hz flicker test consisted of a 30 Hz flicker stimulus against a 587-nm red background light. The flicker stimulus was presented for 20 s with a 10 s rest interval, repeated four times. The integral of the a-wave was measured for both central and non-central locations of the retina.

Results: Total patients: 15

- Controls: 75 people: Males 32, Age 41-60 yrs: 15, 61-80 yrs: 15
- Diabetes: 19 people: Males 9, Age 41-50 yrs: 6, 51-60 yrs: 4, 61-70 yrs: 4, 71-80 yrs: 3
- Glaucoma: 21 people: Males 9, Age 41-50 yrs: 6, 51-60 yrs: 6, 61-70 yrs: 4, 71-80 yrs: 3, 81-90 yrs: 2

- Average Implicit Time (ms) Controls vs Diabetes p<0.0001
- Average Implicit Time (ms) Controls vs Glaucoma p<0.0001

- Sensitivity and Specificity of Control vs Diabetes
  - Age vs Implicit Time (ms)
  - Sensitivity = 73.7%
  - Specificity = 66.6%

- Sensitivity and Specificity of Control vs Glaucoma
  - Age vs Implicit Time (ms)
  - Sensitivity = 73.7%
  - Specificity = 66.6%

- Conclusions
  1. Implicit times were significantly different between diabetics and controls, and diabetes and controls patients and in patients with good visual acuity.
  2. The RETeval test takes 5-7 seconds to administer thus providing a quick quantitative, screening evaluation of diabetes and glaucoma.
  3. Further studies with more patients and controls will be needed to further delineate the capabilities of the RETeval device.

References
