



Evaluation of Ring Amplitude and Factors Affecting Ring Amplitude in Multifocal Electroretinography in Diabetic Eyes

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Received 09 May 2022, Accepted 01 Jul 2022, Published online: 14 Jul 2022

Purpose

The aim of this paper was to evaluate the ring amplitudes in diabetic patients and to evaluate the effect of the risk factors for diabetic retinopathy on the ring amplitudes. We also aimed to investigate the success of ring amplitudes in classifying diabetic retinopathy.

Methods

The study included 32 eyes of 32 diabetic patients without retinopathy (DM), 34 eyes of 34 patients with mild non-proliferative diabetic retinopathy (NPDR) without macular edema, and 62 eyes of 62 age- and sex-matched controls (CG). All subjects were evaluated using mfERG. The relationship between age, diabetes duration, HbA1c and ring amplitudes and the effect of diabetes and hypertension on ring amplitudes were evaluated. Three-way ROC analysis was performed to evaluate the discrimination power of the ring amplitudes.

Results

In the comparison of the ring amplitudes, the amplitudes of the DM and NPDR groups were statistically significantly decreased compared to the CG ($p < .05$). A moderate to strong correlation was found between the duration of diabetes, HbA1c and ring amplitudes ($p < .05$). The effect of diabetes decreased towards the peripheral rings and hypertension did not affect ring amplitudes.

Volume under the ROC surface of $R1 = 0.65$ had $p < .05$ and 95% CI [0.50–0.72], and the best cut-off point pair to differentiate the three classes was found to be $c_1 = 217.3$, $c_2 = 151.2$ in three-way ROC analysis.

Conclusion

In conclusion, the effects of diabetes are unevenly distributed on the retina topographically. Diabetes affects the central rings more than peripheral rings in multifocal ERG. Both ring densities and ring ratios are effective ways to identify early changes in retinal function.