Multifocal Electroretinogram Delays Reveal Local Retinal Dysfunction in Early Diabetic Retinopathy

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**Purpose:** To spatially determine areas of varying retinopathy in patients with diabetes using multifocal electroretinogram (mfERG) and fundus photography.

**Methods:** Sixteen diabetic patients were recruited, 8 with non-proliferative diabetic retinopathy (NPDR) and 8 without retinopathy. MfERG was run on each eye with the VERIS system. The first order kernel implicit time (IT) and amplitude (Amp) were compared with 16 non-diabetic controls (one eye each). Amp and IT response maps were overlaid with 30-degree stereoscopic fundus photos.

**Results:** Implicit time delays were observed in retinal areas with anatomical retinopathy lesions in the NPDR subjects. Retinal areas adjacent to lesioned areas exhibited IT delays, but to a lesser extent. Smaller areas of delays were also observed in retinal locations within the diabetic group without retinopathy. In contrast, amplitude showed no significant difference in lesioned areas versus areas without retinopathy.

**Conclusion:** Functional testing with the mfERG associates local areas of retinopathy with varying severity, including areas without retinopathy. Furthermore, delays in IT showed retinal functional changes before clinical signs of retinopathy were observed. This subclinical detection can improve early detection of retinal conduction delays. However, response amplitude showed no significant correlation in areas with or without retinopathy.

In addition to presenting this paper by Fortune, this talk conclude with the presentation of pilot data from Smith et al., which uses similar and expanded techniques in patients with diabetes and prediabetes.