MFERG FINDINGS AFTER THREE MONTHS INTRAVITREAL RANIBIZUMAB TREATMENT FOR DIABETIC MACULAR EDEMA

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Introduction: In this study we aim to evaluate early multifocal electroretinogram (mFERG) changes in eyes with diabetic macular edema (DME) at baseline and after undergoing ranibizumab treatment and investigate possible associations with visual acuity (VA) and optical coherence tomography (OCT).

Materials and Methods: Observational, longitudinal, prospective study. Treatment-naïve patients in DME who met inclusion/exclusion criteria underwent a course of monthly injections of ranibizumab over three months. At baseline and at month 3, every subject was evaluated with best corrected visual acuity (BCVA), OCT and mFERG. The P1 amplitude and latency component of the mFERG was measured and averaged over six concentric rings (radii 3º, 3-7.8º, 7.8-15º, 15-24º, 24-31º and 31-42º). mFERG change at month 3 was defined as a percentage of baseline amplitude value. We used a control group of 42 age-matched subjects to obtain normal data. Group comparisons (DME vs control) and paired comparisons (at baseline and at month 3) were conducted, as well as subgroup analysis according to BCVA response (poor responders – decrease or increase < 5 ETDRS letters; responders – increase between ≥ 5 and < 10 letters; and good responders – increase ≥ 10 letters). Correlation analysis was performed with BCVA, central macular thickness (CMT) and mFERG amplitude and latency.

Results: Thirty-two eyes of 32 subjects with DME eligible for ranibizumab treatment were enrolled in the study. Significant differences were observed in mFERG amplitude components in all six ring regions of the retina between eyes with DME and controls (p < 0.0001) and in the latency component only for the innermost ring (p < 0.0001). A moderate correlation was found between mFERG amplitudes and BCVA, but not CMT, in the innermost ring (p=0.043, r=0.35). After 3 months of treatment, an improvement of mFERG amplitude was registered in 44% (14 out of 32) of the treated eyes (4 subjects had an improvement in amplitude of the innermost ring between 25% and 40% and 10 subjects had an improvement > 40%). Only good BCVA responders (14 out of 32 eyes) showed statistically significant improvements in mFERG amplitude (16.49 nV/deg², p=0.013) and latency (-0.005 ms, p=0.048), and only for the innermost ring.

Conclusions: Amplitude of mFERG responses in all rings is significantly reduced in patients with DME, when compared to normal subjects, accompanied by a significant increase in central latency. Baseline amplitude correlates to baseline BCVA, but not CMT. Good clinical responders to a 3-injection course of intravitreal ranibizumab show a significant increase central mFERG amplitude response. Our results show that mFERG is able to demonstrate baseline outer retina dysfunction in DME and its early functional improvement after treatment.