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Nº CEP
0855/07

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Comparison of the single and double density macular grid laser photocoagulation for diabetic macular edema using micropulse 810nm diode laser

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Purpose: To compare single versus double density laser photocoagulation techniques for treatment of diabetic macular edema with a micropulse 810nm diode laser. The single density is based on the Early Treatment Diabetic Retinopathy Study (ETDRS) grid photocoagulation technique and the double density increases the number of spots to potentially enhance the area of retinal pigment epithelium activation. The selectivity of the micropulse laser treatment was studied using autofluorescence and mfERG (multifocal electroretinogram).
Methods: Patients with diabetic macular edema were assigned to receive laser photocoagulation by either single or double density technique. Visual acuity, fundus photographs and fluorescein angiography, and optical coherence tomography measurements were obtained at baseline and at 1, 3 and 6 months. Treatment was repeated if diabetic macular edema persisted. Autofluorescence imaging and mfERG were obtain for selected patients. Change in optical coherence tomography measurements at 6-month follow-up and visual acuity were the main outcome.
Results: Sixty patients were divided into single density group (n=30) and double density (n=30). There were no differences in age, gender or systemic diabetes status (measured by HbA1c). There was no difference in best corrected visual acuity for either group at 6 months follow up. OCT central macula thickness was decreased in both groups, although it was thinner in the double density group. Fundus photographs failed to identify most of the laser spots, although fluorescein angiography could identify partially the marks. MfERG and autofluorescence studies are ongoing.
Conclusions: At 6 months after treatment, the double density technique was more effective at reducing optical coherence tomography–measured retinal thickening than the single density approach. However, the visual acuity outcome with both approaches was not different for this population. Selectivity studies appear to confirm the hypothesis that micropulse laser is more selective

to the RPE and it may also induce less damage to the retina, although these studies are still being concluded.