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Optical Coherence Tomography Angiography of Retinal Microvasculature in Diabetic Eyes without Retinopathy Undergoing Cataract Surgery: A Prospective Observational Study

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This prospective observational study evaluated retinal microvascular changes using optical coherence tomography angiography (OCTA) in diabetic eyes without clinical diabetic retinopathy (DR) undergoing cataract surgery and correlated baseline OCTA metrics with postoperative visual outcomes. Ninety-four Type 2 diabetic patients (>5 years duration) with visually significant cataract and no clinical DR were enrolled after ethics committee approval and informed consent. All participants underwent 3×3 mm macular OCTA scans preoperatively and at 30 days postoperatively to measure superficial and deep capillary plexus vessel density (VD), foveal avascular zone (FAZ), and image quality index. Cataract surgery was performed via small incision cataract surgery or phacoemulsification, and best-corrected visual acuity (BCVA) was recorded. Statistical analysis using SPSS v22 revealed a significant postoperative increase in VD in both superficial and deep plexuses ($p < 0.01$) and a reduction in FAZ area ($p < 0.05$). Baseline FAZ area correlated negatively with postoperative BCVA ($r = -0.52$, $p < 0.001$), and lower preoperative DCP VD predicted poorer visual outcomes ($r = -0.48$, $p < 0.01$). These findings establish OCTA as a sensitive, non-invasive biomarker for detecting subclinical ischemia and predicting visual recovery, offering a powerful adjunct in pre- surgical risk stratification and individualized care for diabetic patients.

Keywords: Cataract Surgery, Diabetic Eyes, OCTA, Subclinical Ischemia, Visual Prognosis

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