



EARLY DETECTION OF DIABETIC RETINOPATHY USING OPTICAL COHERENCE TOMOGRAPHY ANGIOGRAPHY

Jorge Santiago Andrade Romo, MD | NYEEI of Mount Sinai

PURPOSE

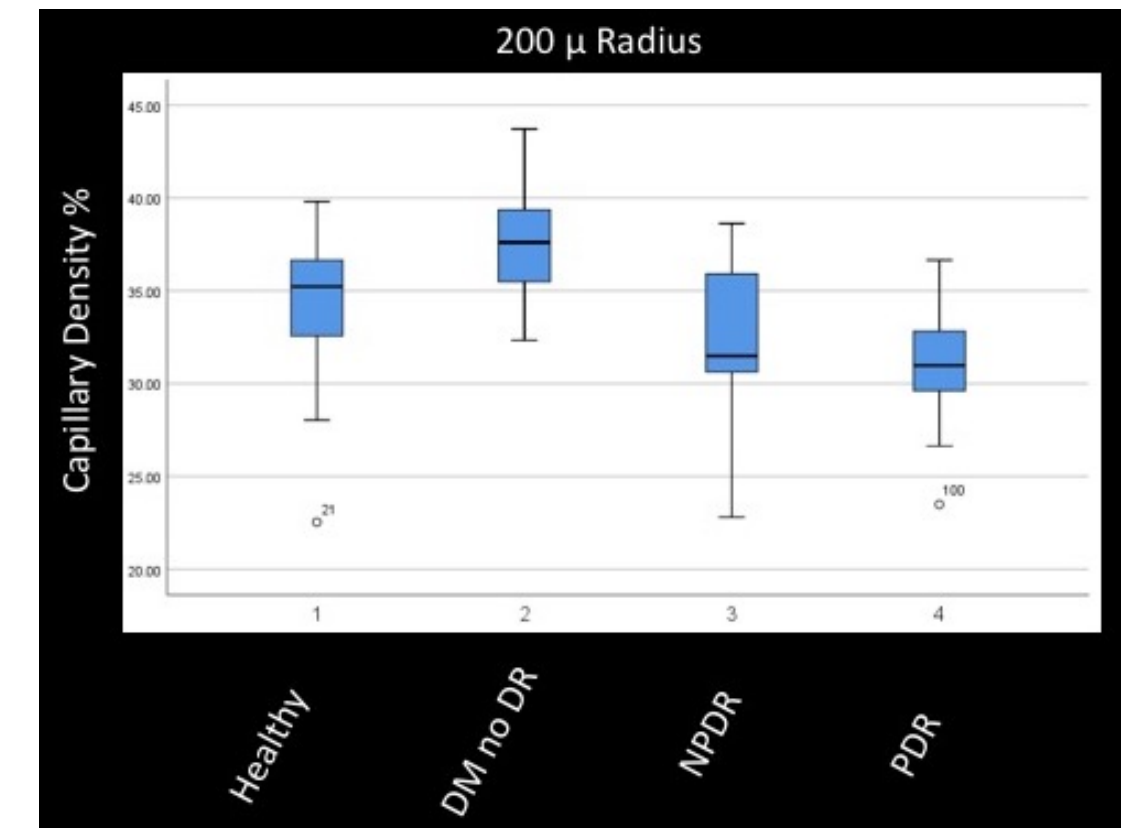
Optical coherence tomography angiography (OCTA) is a promising imaging technique that allows for noninvasive and quick evaluation of macular perfusion without the need for extrinsic dye injection. In this study, we analyzed the macular capillary densities measured in eyes with different stages of diabetic retinopathy using OCTA, and demonstrated its potential clinical application for early detection of diabetic retinopathy.

METHODS

3x3 mm macular OCTA scans of 30 age-matched controls and 76 diabetic patients [30 with diabetes mellitus no diabetic retinopathy (DMnoDR), 23 with nonproliferative diabetic retinopathy (NPDR), and 23 with proliferative diabetic retinopathy (PDR)] were obtained using a commercial OCTA (Avanti RTVue-XR; Optovue). Image analysis was performed on the full OCTA layer which included blood vessels located between the inner limiting membrane and the posterior boundary of the outer plexiform layer. After the removal of large vessels, macular capillary density was measured on the full OCTA layer using custom MatLab software. Macular capillary density was computed within a 200µm width annulus from the FAZ margin. One-way ANOVA and post-hoc Tukey's HSD test were performed to assess statistical significance among groups.

RESULTS

Mean (\pm SD) of capillary densities measured at the 200µm annulus for the control, DMnoDR, NPDR and PDR were 35.63 ± 3.83 , 37.44 ± 3.26 , 32.87 ± 3.20 , and $30.95 \pm 3.00\%$, respectively. There was stepwise reduction of capillary density as diabetic retinopathy advanced except for the DMnoDR group. Capillary density in the DMnoDR group was found to be significantly higher compared to the other three groups ($P < .05$).



CONCLUSION

Our finding of higher capillary density measured in the DMnoDR supports the hypothesis of capillary dilation precedes clinical diabetic retinopathy (Glover et al, J Ocul Pharmacol Ther, 2000). Our unique quantitative analysis approach of macular capillary density may prove useful for earlier diabetic retinopathy detection and monitoring disease progression.