Comparison of WF SSOCTA with UWF Color Fundus Photography and Fluorescein Angiography for Detection of Lesions in Diabetic Retinopathy

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Purpose:
To compare widefield swept-source optical coherence tomography angiography (WF SS-OCTA) with ultra-widefield color fundus photography (UWF CFP) and fluorescein angiography (UWF FA) for detecting diabetic retinopathy (DR) lesions.

Methods:
This prospective, observational study was conducted at Mass Eye and Ear from December 2018 to October 2019. Proliferative diabetic retinopathy (PDR), non-proliferative diabetic retinopathy (NPDR) and diabetic patients with no DR were included. All patients were imaged with a WF SS-OCTA using a Montage 15mm×15mm scan. UWF CFP and FA were taken by a 200 degree, single capture retinal imaging system. Images were independently evaluated for the presence or absence of DR lesions including microaneurysm (MA), intraretinal microvascular abnormalities (IRMAs), neovascularization elsewhere (NVE), neovascularization of the optic disc (NVD) and nonperfusion areas (NPAs). All statistical analyses were performed using SPSS 25.0.

Results:
One hundred and fifty-two eyes of 101 participants were included in the study. When compared with UWF CFP, WF SS-OCTA was found to be superior in detecting IRMAs (P<0.001) and NVE/NVD (P=0.007). The detection rate of MA, IRMAs, NVE/NVD and NPAs in WF SS-OCTA were comparable with UWF FA images (P>0.05). Furthermore, when we compared WF SS-OCTA plus UWF CFP with UWF FA, the detection rates of MA, IRMAs, NVE/NVD and NPAs were identical (P>0.005). Agreement (κ=0.916) between OCTA and FA in grading PDR and NPDR was excellent.

Conclusions:
WF SS-OCTA is useful for identification of DR lesions. WF SS-OCTA plus UWF CFP may offer a less invasive alternative to FA for DR diagnosis.