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Retinal microvascular and choroidal structural changes in patients with Parkinson's disease and vascular parkinsonism: a pilot study

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Introduction: Diagnostic differentiation between patients with Parkinson's disease (PD) and vascular parkinsonism (VP) relies mainly on clinical and neuroimaging features. Nevertheless, noninvasive retinal imaging using Spectral-Domain (SD-OCT) and Optical Coherence Tomography Angiography (OCT-A) are increasingly recognized methods that may help to detect changes in neurodegenerative diseases.

Objective: To compare SD-OCT and OCT-A features between patients with PD, VP and healthy controls.

Methods: We collected clinical and OCT data on 14 PD patients, 7 VP patients and 17 healthy controls. Patients with diabetes mellitus, glaucoma, cataract, other retina and/or macular diseases, uncontrolled arterial hypertension were excluded. SD-OCT and OCT-A were used to assess: retinal nerve fiber layer (RNFL) average thickness, macular ganglion cell complex (GCC) thickness, central macular thickness (CMT), radial peripapillary plexus, choroidal thickness, vessel density of the superficial and deep capillary plexus, foveal avascular zone (FAZ) and choriocapillaris flow area. Total and luminal choroidal area and choroidal vascularity index (CVI) were also calculated using Image J software.

Results: Compared to healthy controls, PD and VP patients showed higher values of deep capillary plexus vessel density ($p=0.002$ and $p=0.049$ respectively), CVI ($p<0.001$ and $p=0.002$ respectively), total ($p<0.001$ and $p=0.046$ respectively) and luminal ($p<0.001$ and $p=0.011$ respectively) choroidal area. Furthermore, PD patients displayed higher CMT values ($p=0.036$). A tendency towards significance was found in choroidal thickness values difference between PD and VP patients ($p=0.08$).

Conclusion: These preliminary findings suggest that VP and PD patients differ in terms of SD-OCT and OCT-A findings from healthy controls. Albeit non-significant, VP and PD patients showed different values of choroidal thickness. Given these observations, microvascular and structural retinal and choroidal changes could constitute potential biomarkers that might enhance clinical individuation of PD and VP patients.