

BIOMARKERS (NON-NEUROIMAGING)

Association of Retinal Perfusion with Plasma Biomarkers of Alzheimer's Disease

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Abstract

Background: The eye has been considered a 'window to the brain' and to several neurodegenerative brain disorders including Alzheimer's disease (AD) that display alterations in the eye, especially the retina. Plasma levels of AD biomarkers, including A β 42/A β 40 ratio, pTau 181, glial fibrillary acidic protein (GFAP), total Tau (tTau), and Neurofilament lightchain (NfL) are significantly altered in AD patients. We sought to evaluate the association of retinal perfusion measured using optical coherence tomography angiography (OCTA) with plasma biomarkers of AD.

Method: Participants (31; 5 mild cognitive decline/AD, 6 subjective cognitive decline and 20 cognitively normal) underwent ophthalmological evaluation including OCTA and a blood sample. Single molecule array (Simoa) assays were used to measure plasma concentrations of A β 42, and A β 40, pTau181, GFAP, Ttau, and NfL. Partial Pearson correlations, covaried for age and sex, were used to compare retinal vessel and perfusion density with plasma level of the A β 42/A β 40 ratio, pTau181, GFAP, tTau and NfL.

Result: Plasma A β 42/A β 40 showed a significant positive association with retinal vessel density ($r=0.398$ $p = 0.036$) and perfusion density ($r = 0.384$ $p = 0.044$). pTau 181 showed a significant negative association with retinal perfusion density ($r=-0.499$ $p = 0.041$). GFAP showed a significant positive association with foveal avascular zone area in the superficial capillary plexus ($r=0.554$ $p = 0.021$).

Conclusion: The majority of the sample was cognitively normal or mildly impaired, suggesting that retinal perfusion may be a useful tool for early diagnosis of AD-related pathophysiology. Future longitudinal studies in larger samples and evaluating the

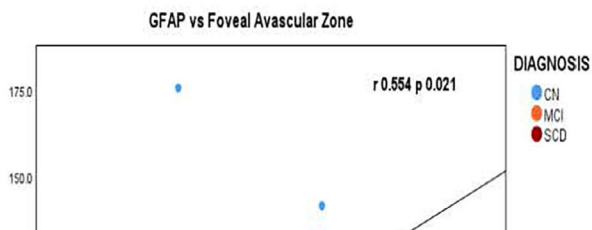
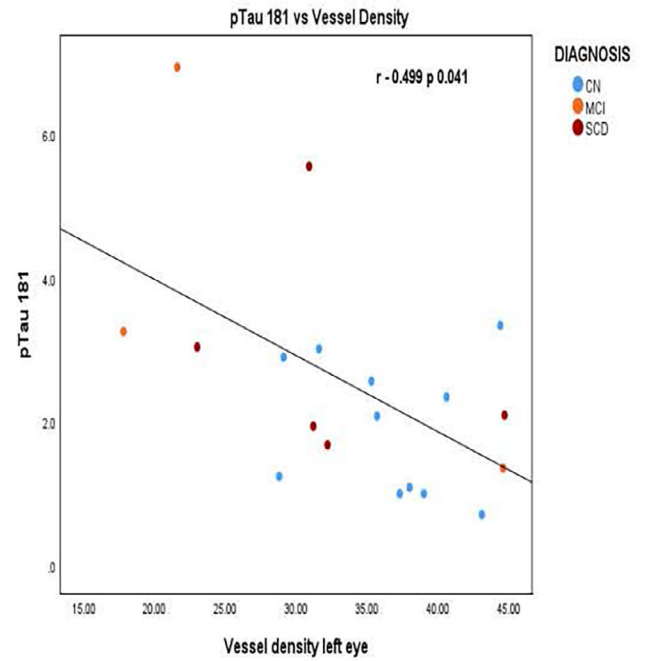
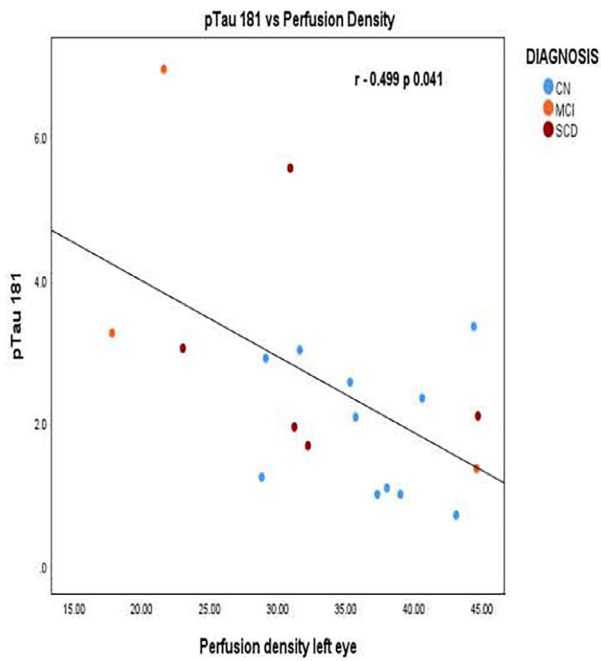
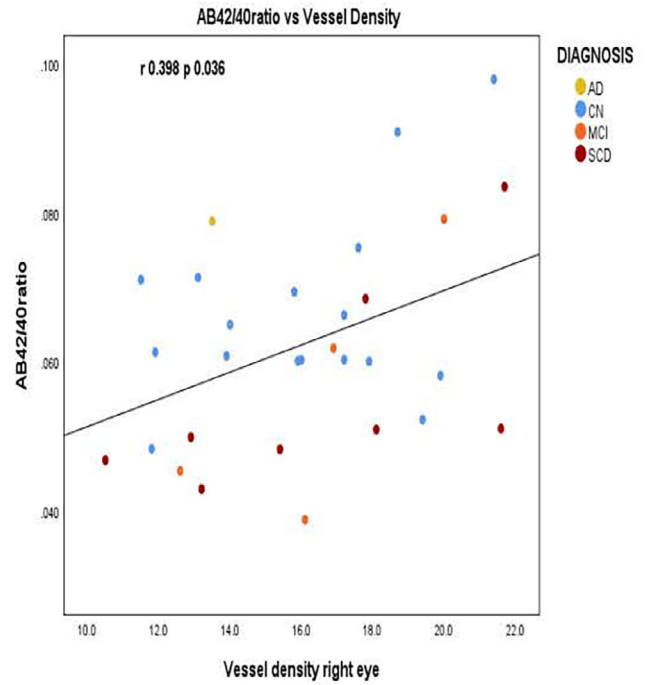
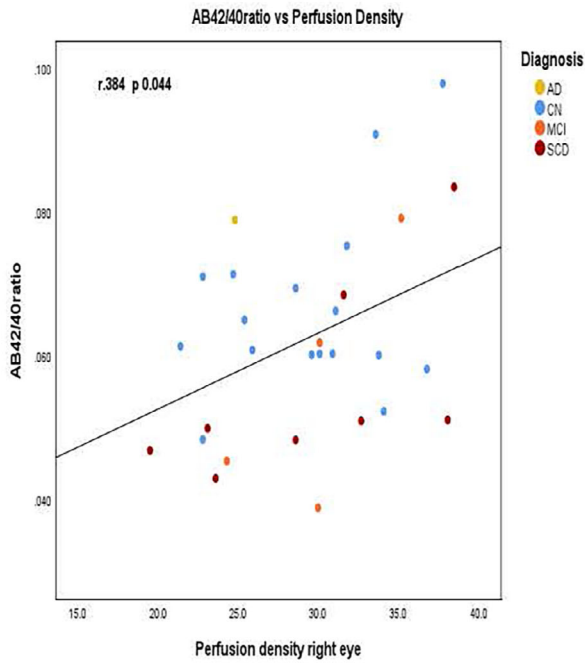
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utility of combining retinal and plasma biomarkers for predicting future progression to AD are needed.



	Ab42/40 ratio	GFAP	pTau181
3*3 PD (R)	<i>r</i> .384/ <i>p</i> 0.044		
3*3 VD(R)	<i>r</i> .398/ <i>p</i> .036		<i>r</i> -.374/ <i>p</i> .086
6*6 PD (R)			
6*6 VD (R)			
6*6 PD (L)	<i>r</i> .412/ <i>p</i> .051		<i>r</i> -.499/ <i>p</i> .041
6*6 VD (L)	<i>r</i> .398/ <i>p</i> .066		<i>r</i> -.499/ <i>p</i> .041
6*6 FAZ (R)		<i>r</i> .554/ <i>p</i> .021	
6*6 FAZ (L)			
3*3 FAZ (L)		<i>r</i> .479/ <i>p</i> .097	