

AB035. The link between cognitive impairment and drusen quantity in age-related macular degeneration

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Background: Age-related macular degeneration (AMD) is a common cause of severe vision impairment in populations over 50 years old. It is characterized by drusen; the accumulation of waste between the retinal pigment epithelium and Bruch's membrane. Drusen have been identified in the eyes of Alzheimer's patients, post-mortem. Further, beta-amyloid, best known as a pathological component of the senile plaques in Alzheimer's disease, has been identified as a component of drusen in AMD. Researchers have also demonstrated an increased prevalence of cognitive impairment in individuals with AMD. The current study uses optical coherence tomography (OCT) and a cognitive assessment to investigate the potential use of drusen as a biomarker of cognitive impairment. The overall number of drusen detectable on the OCT scans of individuals who exhibit mild cognitive impairment is compared to the number of drusen detectable on the OCT scans of individuals who do not exhibit mild cognitive impairment.

Methods: To date, 10 participants (nine women) aged 74 to 95 years with a diagnosis of AMD and/or drusen have been recruited. The Optos® OCT/SLO imaging system was used to take cross-sectional images of the retina. The

images were then manually graded by two trained graders to determine the number of drusen present along the retina. The Montreal Cognitive Assessment (MoCA) was used to assess overall cognitive status.

Results: Of the 10 participants, three passed the full MoCA (i.e. scored at or above 26 out of 30 possible points) and seven did not pass, scoring positive for mild cognitive impairment ($M_{pass} = 27.33$, $SD_{pass} = 0.58$; $M_{fail} = 21.86$, $SD_{fail} = 2.55$). Preliminary analyses have demonstrated that individuals who pass the MoCA seem to have fewer drusen present overall ($M_{dn} = 35$) compared to those who score positive for cognitive impairment ($M_{dn} = 63$). However, a Mann-Whitney U test revealed that these findings are not significant; $U = 5$, $P = 0.27$.

Conclusions: The results agree with previous literature demonstrating an increased prevalence of mild cognitive impairment in individuals with AMD. The larger average number of drusen found in individuals who score positive for cognitive impairment points to a difference in retinal abnormalities based on cognitive status. Beyond sample size, the insignificance of the difference between groups at this stage can be explained by the number of individuals who failed the MoCA who have wet AMD ($n = 5$). The wet AMD makes grading of drusen on OCT scans more difficult due to scarring and warping of the retina. This could result in an under-representation of the number of drusen. Data collection is still underway, and an accurate depiction is expected with a larger sample size. Researchers have also suggested the importance of peripherally located drusen and its link to cognitive impairment, therefore, future analysis will consider this as well.

Keywords: Age-related macular degeneration (AMD); drusen; cognitive impairment; aging

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