Comparison of visual function in structurally defined sub-phenotypes of intermediate AMD: A MACUSTAR study report | IOVS

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Abstract

Purpose : To investigate whether reclassifying eyes with intermediate (i)AMD by additional imaging-based biomarkers identifies sub-phenotypes of iAMD with reduced visual function (VF).

Methods : People with no AMD and Beckman defined iAMD in the MACUSTAR study performed Best Corrected Visual Acuity (BCVA), Low Luminance Visual Acuity (LLVA), Moorfields Acuity Test (MAT), Pelli Robson Contrast Sensitivity (CS), International Reading Speed Test (IReST), Mesopic (MesAT) and Scotopic (ScoAT) average thresholds (S-MAIA microperimetry) and AdaptDx Rod Intercept Time (RIT), followed by multimodal imaging (colour fundus and confocal infrared photography, fundus autofluorescence and spectral domain optical coherence tomography). Images were graded by a central reading centre for presence of the following features: pigmentary abnormalities (PA), reticular pseudodrusen (RPD), incomplete and complete retinal pigment epithelium and outer retinal atrophy (iRORA and cRORA). Pairwise complete VF data were compared across three structurally defined groups; no AMD, iAMD feature absent(-) and iAMD feature present(+) using nonparametric Kruskal-Wallis, followed by pairwise Wilcoxon tests. Being a signal seeking exploratory analysis, multiple testing correction was not applied.

Results : 224 people (n=56 no AMD [33F; mean age 68 yrs]; n=168 iAMD [106F; 71 yrs]) were included in this analysis. Of those with iAMD, 96(57%) had PA, 37(22%) had RPD, 18(11%) had iRORA and 7(4%) had cRORA. With the exception of IReST, those with iAMD and absent structural features had worse median VF than those with no AMD on all measures ($p<0.01$). LLVA, CS, MesAT, ScoAT and RIT were worse in those with iAMD+RPD compared to iAMD−RPD ($p<0.04$). LLVA, CS, MAT, MesAT and ScoAT were worse in those with iAMD+cRORA compared to iAMD−cRORA ($p<0.05$). CS was worse in those with iAMD+PA compared to iAMD−PA ($p=0.01$). There were no median differences between presence or absence of iRORA in any VF measure.

Conclusions : Though ascribed the same AMD disease stage, eyes with iAMD+RPD and iAMD+cRORA had poorer low luminance and contrast vision than other iAMD eyes. As the number of eyes with observed structural features is small, we aim to confirm our findings in a large longitudinal cohort and examine whether additional structural or functional features should be accounted for in AMD disease classification or used as entry criteria in treatment trials.

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