Public Health Scotland

Retinal Feature Changes Over Time in AMD, Glaucoma, and Controls

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Purpose

Most research on disease-associated retinal changes uses cross-sectional rather than longitudinal design. This study analyses longitudinal changes in computationally-derived retinal characteristics leading up to a diagnosis of age-related macular degeneration (AMD) or glaucoma.

We hope that this will add to the evidence base around disease progression and provide insight into early detection.

Results

The distribution of the four extracted features by group is shown here:

Feature value by age for the people in disease groups compared to their age-matched control groups is shown here.

The relationship between feature value and age was analysed using a linear regression model, comparing condition groups.



Feature by age



The relationship between feature and age differed in the disease and control groups:

- AVRz decreased slightly with age in the control group but increased with age in AMD (p=0.001)
- vFD decreased in both control groups (~ 0.002 per year) & both disease groups decreased with age significantly more (p<0.00001).



For more information about the SCONe retinal image repository, email <u>scone@ed.ac.uk</u> or visit our website -->





Methods

dimension (vFD); vertical cup-to-disc ratio (vCDR), and the ratio of drusen area within a specific zone around We used the Scottish Collaborative Optometry-Ophthalmology Network e-research (SCONe); a large community-acquired retinal image repository held within the Public Health Scotland National Safe Haven; a the fovea (DRZf). AVRz, vFD and vCDR were calculated using AutoMorph-Python, DRZf using Drusen-Python. Trusted Research Environment. Within that safe space, the retinal images are linked to routinely collected An appropriate summary value was calculated at each image date for each pair of eyes (mean or maximum) healthcare data including community ophthalmic data and hospital in- and out-patient records. to represent the 'worst' eye at that time point, because the clinical codes for AMD and glaucoma are not eye-specific.

Pre- and (up to 1 year) post-diagnosis images from 952 people with a healthcare record code for AMD and 1,309 with glaucoma were compared to images from 1,929 and 2,259 (respectively) age-matched people with no code for either disease in their records.

Retinal features were extracted, including arteriolar-venular ratio (AVRz) measured using the Knudston

To identify age-matched controls for the AMD and glaucoma groups, we used their age at the image date nearest to their earliest diagnostic and the final available image date for people without either disease. Feature values at each available image date up to that reference date were used for analysis.

		Siddeollid	
coefficient	p-value	coefficient	p-value
-0.00028	0.0046	-0.00014	0.16
-0.038	0.001	-0.018	0.1
0.00057	0.001	0.00036	0.033
-0.0018	<0.00001	-0.002	<0.00001
0.074	<0.00001	0.046	<0.00001
-0.0014	<0.00001	-0.00097	<0.00001
-0.0078	0.0004	-	-
-0.021	0.9	-	-
0.0052	0.15	-	-
-	-	0.00058	<0.00001
-	-	0.013	0.3
-	-	0.00056	0.0049

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