OPEN ACCESS
ARVO Annual Meeting Abstract | July 2019

Effect of Age-related Macular Degeneration on changes in choroidal thickness induced by retinal defocus

John R Phillips; Tzu-Lan Chen; Samuel T-H Chiang

+ Author Affiliations & Notes

Investigative Ophthalmology & Visual Science July 2019, Vol.60, 3440. doi:

Abstract

Purpose : Recent research indicates that vascular changes in the ocular choroid occur early in the pathogenesis of Age-related Macular Degeneration (AMD). In normal subjects, imposing optical defocus to the retina causes changes in the thickness of the choroid, with choroidal thickening and thinning associated with myopic and hyperopic retinal defocus respectively. We aimed to investigate whether the presence of AMD altered these choroidal responses to imposed retinal defocus, as a potential indicator of early functional changes to the choroid in AMD.

Methods :
Forty subjects (20 with early AMD and 20 age- and gender-matched normals) all with normal visual acuity and ranging in age from 54 to 64 years, viewed a distant target (video movie at 6 m) for 60 minutes on two occasions while sub-foveal choroidal thickness (SFCT) was monitored with optical coherence tomography every 20 minutes. On each occasion, both eyes were optimally corrected for distance: one eye acted as control, while the other (experimental) eye viewed through an additional ophthalmic lens: a +2.00D lens imposing myopic defocus on one occasion and a -2.00D lens imposing hyperopic defocus on the other occasion.

Results :
Baseline SFCT was not significantly different in eyes with AMD and in normal eyes (mean ± 1SD: SFCT(AMD) = 210 ± 83μm vs SFCT(Normal) = 229 ± 76μm, p = 0.64).

Myopic retinal defocus caused significant thickening of the choroid in eyes of both groups, but the degree of thickening was significantly less in eyes with AMD (ΔSFCT(AMD): +5.6 ± 2.4μm; vs ΔSFCT(Normal): +11.0 ± 4.4μm; $p < 0.0001$). Hyperopic retinal defocus caused significant thinning of the choroid in eyes with AMD and in normal eyes and the degree of thinning was not different (ΔSFCT(AMD): -10.3 ± 6.8μm; vs ΔSFCT(Normal): -9.3 ± 3.24μm; $p = 0.58$)

Conclusions :
Thickening of the choroid in response to myopic retinal defocus was significantly reduced in eyes with early AMD, whereas thinning in response to hyperopic retinal defocus was unaffected. This may suggest that the capacity of the choroid to expand (e.g. in response to demands for increased blood flow) is compromised in eyes with early AMD, whereas its ability to become thinner remains unaltered.

This abstract was presented at the 2019 ARVO Annual Meeting, held in Vancouver, Canada, April 28 - May 2, 2019.