Increased Systemic C-Reactive Protein is Associated with Choroidal Thinning in Intermediate Age-Related Macular Degeneration

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Purpose:
To examine the association between C-reactive protein (CRP) and choroidal thickness (CT) in patients with intermediate age-related macular degeneration (iAMD). In previous research, CRP and choroidal thinning have been shown to be risk factors for progression to advanced AMD. Moreover, higher levels of CRP have been found in the choroidal vasculature of patients with AMD compared to controls and have been associated with decreased choroidal perfusion. To date, no relationship has been established between CRP and CT.

Methods:
High sensitivity CRP levels were quantified in 107 serum samples from patients with intermediate AMD, who were part of the Colorado AMD Registry. Choroidal thickness was determined from spectral domain optical coherence tomography (SD-OCT) images. Univariate and multivariable linear regression models accounting for the intra-subject correlation of two eyes were fit using log transformed CT as the outcome.

Results:
The study included 213 eyes from 107 patients with a mean age of 76.8 (SD 6.8). Median CT was 200.5 micrometers (range 86.5-447.0) and median CRP was 1.43 mg/L (0.13-17.10). Higher CRP was associated with decreased CT in the univariate model (p=0.01). Older age and presence of reticular pseudodrusen were significantly associated with decreased CT (p<0.01 both), whereas gender, body mass index, and smoking were not associated with CT. Higher CRP remained significantly associated with decreased CT after adjustment for age and RPD (p=0.01).

Conclusions:
To our knowledge, this is the first study that evaluates the association between levels of circulating CRP with choroidal thickness on SD-OCT in patients with intermediate AMD. This study supports the hypothesis that increased CRP damages the choroid, possibly through a combination of inflammatory and ischemic mechanisms, leading to choroidal thinning and increased risk of progression to advanced AMD. Alternatively, CRP may be a marker for other inflammatory events that mediate ocular disease. Further research is needed to investigate the role of inflammation in intermediate AMD and the potential use of anti-inflammatory agents targeted to circulating inflammatory markers.