Dietary Carotenoids and Risk for Age-related Macular Degeneration in the Age-Related Eye Disease Study (AREDS)

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Background: Lutein and zeaxanthin are isomeric carotenoids of dietary origin that compose macular pigment. These nutrients may protect the retina by: (1) absorbing/attenuating spectral wavelengths associated with photochemical damage; and (2) quenching reactive oxygen species.

Purpose: To evaluate the relationship between dietary carotenoid intake and prevalence of age-related macular degeneration (AMD) in the Age-Related Eye Disease Study (AREDS).

Methods: In this case-control analysis of 4,513 AREDS participants, AMD severity at enrollment was assessed from stereo color fundus photographs. Subjects completed a semi-quantitative validated food frequency questionnaire at enrollment. Nutrient intake estimates were energy-adjusted using the nutrient density model. We used multiple logistic regression methods to evaluate the relationship of major dietary carotenoids with five AMD categories at enrollment (no AMD, intermediate drusen, large drusen, geographic atrophy (GA), or neovascular (NV) AMD).

Results: Lutein/zeaxanthin was the only major dietary carotenoid variable that showed a protective association with AMD at highest intake levels and that persisted in multivariable models. Compared with subjects without AMD, and after statistical adjustment for nutrient- and nonnutrient-based covariates, the likelihood of advanced AMD (either NV AMD or GA) was statistically significantly decreased for the highest vs. lowest quintiles of lutein/zeaxanthin intake (OR = 0.7 for NV AMD (95% CI, 0.5-0.9); OR = 0.5 for GA (95% CI, 0.2-0.9)).

Conclusion: In AREDS participants, a higher intake of lutein/zeaxanthin was associated with a decreased likelihood of having advanced AMD at baseline.

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