FROM ABSTRACT

Context
Age-related macular degeneration (AMD) is the most prevalent cause of irreversible blindness in developed countries.

Recently, high-dose supplementation with beta carotene, vitamins C and E, and zinc was shown to slow the progression of AMD.

Objective
To investigate whether regular dietary intake of antioxidants is associated with a lower risk of incident AMD.

Design
Dietary intake was assessed at baseline in the Rotterdam Study (1990-1993) using a semiquantitative food frequency questionnaire.

Incident AMD until final follow-up in 2004 was determined by grading fundus color transparencies in a masked way according to the International Classification and Grading System.

Setting
Population-based cohort of all inhabitants aged 55 years or older in a middle-class suburb of Rotterdam, the Netherlands.

Participants
Of 5836 persons at risk of AMD at baseline, 4765 had reliable dietary data and 4170 participated in the follow-up.

Main Outcome Measure
Incident AMD, defined as soft distinct drusen with pigment alterations, indistinct or reticular drusen, geographic atrophy, or choroidal neovascularization.

Results
Incident AMD occurred in 560 participants after a mean follow-up of 8.0 years (range, 0.3-13.9 years).
Dietary intake of both vitamin E and zinc was inversely associated with incident AMD.

An above-median intake of all 4 nutrients, beta carotene, vitamin C, vitamin E, and zinc, was associated with a 35% reduced risk of AMD.

Exclusion of supplement users did not affect the results.

Conclusion
In this study, a high dietary intake of beta carotene, vitamins C and E, and zinc was associated with a substantially reduced risk of AMD in elderly persons.

THESE AUTHORS ALSO NOTE:

“Age-related macular degeneration (AMD) is a degenerative disorder of the macula, the central part of the retina.”

“Late-stage AMD results in an inability to read, recognize faces, drive, or move freely.”

Early AMD can be diagnosed by funduscopy.

AMD affects 11.5% of white persons older than 80 years.

“As in other age-related disorders, oxidative stress has been implicated in the etiology of AMD.”

The retina seems particularly susceptible to oxidative stress because of its high concentration of oxygen, polyunsaturated fatty acids, and its exposure to light.

In the randomized, placebo-controlled Age-Related Eye Disease Study (AREDS), supplements containing 5 to 13 times the recommended daily allowance (RDA) of beta carotene, vitamins C and E, and zinc given to participants from retinal clinics with early or monocular late AMD resulted in a 25% reduction in the 5-year progression to late AMD.

These authors sought to investigate whether antioxidants, as present in normal daily foods, play a role in the primary prevention of AMD.

Persons who reported taking supplements containing carotenoids, vitamins A, C, or E, iron, or zinc, as well as multivitamins or multiminerals, were classified as supplement users.

RESULTS

“A significant inverse association was observed for intake of vitamin E, iron, and zinc” and the development of AMD.
These authors excluded the 559 participants who used antioxidant supplements.

COMMENT

“We found that high dietary intake of vitamin E and zinc was associated with a lower risk of incident AMD.”

“An above-median intake of the combination of vitamins C and E, beta carotene, and zinc was associated with a 35% lower risk of incident AMD.”

This is a strong study because it was a prospective design, using a population-based cohort, using similar grading of AMD at baseline and follow-up, and using a long follow-up (8 years).

The largest reduction in AMD risk was “observed for dietary intake above the RDA for all 4 micronutrients.” [All 4 nutrients are important]

“The independent association between antioxidant supplements and AMD could not be examined because of the relatively small number of antioxidant supplement users in our population and the lack of data on duration and dosage of use.”

Antioxidants may have their strongest effect at the initiation of the AMD.

These authors “conclude that dietary antioxidants may delay the development of early AMD and, possibly, of AMD in general.”

Different antioxidants may act synergistically.

“This study suggests that the risk of AMD can be modified by diet; in particular, by dietary vitamin E and zinc.”

“A higher intake of vitamin E can be achieved by consumption of whole grains, vegetable oil, eggs, and nuts.”

“High concentrations of zinc can be found in meat, poultry, fish, whole grains, and dairy products. Carrots, kale, and spinach are the main suppliers of beta carotene, while vitamin C is found in citrus fruits and juices, green peppers, broccoli, and potatoes.”

Based on this study, “foods high in these nutrients appear to be more important than nutritional supplements.”

“Our observational data suggest that a high intake of specific antioxidants from a regular diet may delay the development of AMD.”
KEY POINTS FROM DAN MURPHY

1) Age-related macular degeneration (AMD) is the most prevalent cause of irreversible blindness in developed countries.

2) Recent studies have shown that high-dose supplementation with beta carotene, vitamins C and E, and zinc slow the progression of AMD.

3) In this study, increased food sources of all 4 nutrients, beta carotene, vitamin C, vitamin E, and zinc, were associated with a 35% reduced risk of AMD.

4) In this study, the most important antioxidants from food in the reduced risk of AMD were both vitamin E and zinc.

5) These authors conclude “a high dietary intake of beta carotene, vitamins C and E, and zinc was associated with a substantially reduced risk of AMD in elderly persons.”

6) “As in other age-related disorders, oxidative stress has been implicated in the etiology of AMD.”

7) Antioxidants have their strongest effect at the initiation of the AMD.

8) The risk of AMD can be modified by diet, especially by dietary vitamin E and zinc.