

Issue 71

In a nutshell

Whilst epidemiological links between carotenoid levels and cataracts are strong, clinical trials of carotene supplementation (together with vitamin E) have so far not found any protective effect.

At present, the best advice to offer patients is to eat a diet rich in antioxidant nutrients.

Vitamin A and the eye

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NUTRITION RESEARCH REVIEW

Studies one/two: Carotenoids and cataract extraction

Lutein and zeaxanthin intake are possibly protective against development of cataracts in both men and women, according to the latest results just published from the nurses and male health professionals studies.

Subjects: 36,644 male health professionals (aged 4575 yrs) and 77,466 female nurses in two separate studies.

Method: Dietary questionnaires were administered and follow-up carried out for 8 years in the case of the men, food frequency questionnaires were repeatedly administered during 12 years of follow up in the case of the women. Cataract extraction was monitored in both cases.

Results: After age, smoking, and other potential cataract risk factors were controlled for, dietary intake of the carotenoids lutein and zeaxanthin was associated with lower risk of cataract extraction (see Table).

Table: Relative risk of cataract extraction in relation to carotenoid intake (highest vs lowest quintile of lutein/zeaxanthin intake)

	Women	Men
RR (95% CI)	0.78 (0.63-0.95)	0.81 (0.65-1.01)
p value	p=0.04	p=0.03

Increased intake of foods rich in lutein (spinach and kale) was associated with a moderate decrease in cataract operation risk.

No other carotenoid nor vitamin A was significantly associated with cataract extraction incidence.

Refs: Am J Clin Nutr 1999;70: 509-516 (women) and Am J Clin Nutr 1999;70:517-524 (men) respectively

Study three: Carotenoids and lens opacity

Subjects: 1,354 middle and elderly adults from Wisconsin, USA (Beaver Dam study)

Method: Food frequency questionnaire administered at baseline, nuclear opacity in the eyes assessed using lens photographs taken at baseline and follow-up 13 years later.

Results: The subjects in the highest quintile of lutein-zeaxanthin intake had half the number of cataracts on follow-up (95% CI: 0.3-0.8). Intake of vitamin C and vitamin E was protective against opacities only in those subjects with some other risk factor for cataracts.

Ref: Am J Epidemiol 1999;149:801-9

Studies four/five: Supplements and cataract operations

Supplements of beta carotene or vitamin E do NOT protect against the development of cataracts, according to results from Finland.

Subjects: Nearly 2,000 male smokers from the Alpha-tocopherol Beta-carotene (ATBC) study.

Method: Randomised, placebo-controlled trial in which subjects were given supplements of beta carotene (20 mg/day) or alpha-tocopherol (50 mg/day), alone or in combination. Follow-up for 5-8 years.

Results: No significant protection was observed.

Refs: *J Epidemiol Comm Hlth* 1998;52:468-72 and
Acta Ophthalmol Scand 1997;75:634-40

Comments

Eighteen months ago we reported on a study which provided good evidence that vitamin C supplements may be protective against eye cataracts.

At the time, we commented that the relationship between antioxidants and cataracts was a fascinating one that had yet to be translated into clearcut practical clinical recommendations.

These new studies advance our understanding, but still leave us short of knowing exactly what to recommend to patients at risk.

It is easy to see why antioxidants might be desirable nutrients to prevent cataracts, since one common cause of cataracts is evidently cumulative oxidative damage. For example caused by excess exposure to damaging levels of sunlight, and other oxidative stresses such as smoking.

However, whilst the case for a protective effect of significant intake of vitamin C seems good, defining the exact role of vitamins A and E in this situation has proved more elusive.

Epidemiological evidence of a link between prevalence of cataracts and intake and serum levels of both vitamin A and beta-carotene has been available for some time (e.g. see ^{1, 2}). Since those early reports, however, we have become a lot more aware that not all carotenoids are equal in their antioxidant properties.

These latest studies show how careful we need to be in drawing practical conclusions from epidemiological data. It appears that it is not so much carotenoids as a whole, but particular carotenoids, that are responsible for the protective effects.

It is therefore not surprising that the fourth and fifth studies summarised above show that supplementation with beta-carotene and vitamin E is not effective in preventing cataracts. There really is a lack of randomised controlled clinical trials to show that either dietary change or supplements can prevent cataracts. Those that have been conducted have produced either non-significant or inconsistent results. Some studies have suggested that the preventive effects may be mainly seen in those who have specific risk factors, such as smokers.

So what conclusions can we draw at this point in time? Doctors and dietitians might feel it safe enough to recommend higher dietary intake of antioxidant-rich foods to those at risk of cataract development. The fact that there may be another potential health benefit from eating spinach and kale will no doubt gladden the hearts of mothers everywhere!

But a rationale for the use of antioxidant supplements to prevent eye cataracts still awaits good evidence from clinical trials.

References:
1. *BMJ* 1992;305:1392-4
2. *BMJ* 1992;305:335-9

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