

DIET AND GLAUCOMA



Can lifestyle modifications reduce people's risk of developing the disease?

BY AHMAD A. AREF, MD

FREQUENCY OF A GLAUCOMA DIAGNOSIS IN INDIVIDUALS WHO CONSUME COFFEE, TEA, AND/OR SOFT DRINKS
Wu CM, Wu AM, Tseng VL, et al¹

ABSTRACT SUMMARY

Investigators sought to identify possible associations between the consumption of various beverages, including caffeinated and decaffeinated iced or hot coffee, caffeinated and decaffeinated iced or hot tea, and soft drinks, and a diagnosis of glaucoma. This retrospective, cross-sectional study was conducted using data from the 2005-2006 National Health and Nutrition Examination Survey (NHANES), which queried participants about the frequency of their consumption of the aforementioned beverages.

Study participants had undergone optic disc photography and automated visual field testing with frequency doubling technology (FDT). An individual was diagnosed with glaucoma upon meeting the Rotterdam criteria,² meaning he or she demonstrated (1) two or more reproducible abnormal points on FDT visual field testing in the same eye and (2) an increased cup-to-disc ratio in one eye or cup-to-disc asymmetry that was at least 97.5% greater than in the normal NHANES study population. Exclusion criteria for the study included an absence of optic disc photographs or FDT visual fields, an age younger than 40 years, and the presence of an optic nerve or retinal anomaly that could affect the cup-to-disc ratio.

The NHANES database was sampled using a multistaged probability sampling design. Investigators analyzed the consumption of beverages as categorical variables based on ranges

STUDY IN BRIEF

- In a cross-sectional study using a large, nationally representative database, daily consumption of hot tea was associated with a significantly decreased risk of glaucoma diagnosis on the basis of optic nerve and visual field evaluation.

WHY IT MATTERS

- Risk modification for glaucoma is largely limited to lowering IOP by medical, laser, and surgical means. Lifestyle modification, if shown to affect disease development, could play a complementary role in risk reduction. Results of this study support further research to elucidate the potential relationship between hot tea consumption and glaucoma risk.

of consumption frequency, and they analyzed glaucoma diagnosis in a binary fashion. Logistic regression modeling was then carried out to look for an association between beverage consumption frequency and a diagnosis of glaucoma.

The NHANES sample consisted of 1,678 patients. The prevalence of glaucoma in this group was 3.2%. Within the sample, the investigators found no statistically significant association between the consumption of caffeinated or decaffeinated iced or hot coffee, caffeinated or decaffeinated iced tea, decaffeinated hot tea, or soft drinks and a diagnosis of glaucoma. Participants who consumed caffeinated hot tea on a daily basis, however, were found to have a reduced likelihood of glaucoma diagnosis (odds ratio [OR] = 0.26, $P = .004$).

DISCUSSION

Why might drinking hot tea reduce the likelihood of a glaucoma diagnosis?

Phytochemicals and flavonoids are two classes of plant compounds found in tea. These compounds have

antiinflammatory and antioxidant properties that may be protective against glaucomatous optic neuropathy. Further, research has suggested that flavonoids may promote vasodilation and thereby aid optic nerve perfusion.³

Why did iced tea not affect the likelihood of a glaucoma diagnosis?

Iced tea can be prepared instantly instead of freshly brewed. The NHANES did not query participants regarding their method of iced tea preparation. This is important because instant iced tea contains fewer flavonoids than brewed iced or hot tea. Further, the study's limited sample size may have affected investigators' ability to detect a possible protective effect of iced tea.

Should hot tea consumption be recommended to patients at risk of developing glaucoma?

Although the results of this retrospective research are encouraging, a number of limitations preclude eye care providers from firmly making this

recommendation. As a cross-sectional study, this investigation could not establish a temporal and causal relationship

between hot tea consumption and glaucoma. This study found that hot tea was not harmful and that it might be

beneficial. Practitioners may relay these results to patients who inquire about dietary factors and glaucoma risk.

ASSOCIATION OF DIETARY FATTY ACID INTAKE WITH GLAUCOMA IN THE UNITED STATES

Wang YE, Tseng VL, Yu F, et al⁴

ABSTRACT SUMMARY

Researchers investigated the association between dietary intake of polyunsaturated fatty acids (PUFAs) and glaucoma diagnosis in a cross-sectional population-based study using the NHANES database. Participants were asked about their general dietary intake of PUFAs and their consumption of specific subtypes, including eicosapentaenoic acid (EPA) and docosahexaenoic acid (DHA). They underwent optic disc photography and FDT automated visual field testing, and a diagnosis of glaucoma was made using the Rotterdam criteria.²

Inclusion criteria included age greater than 40 years, completion of the entire interview with regard to dietary history, and availability of optic disc photographs and visual field study results. Patients with an alternative explanation for optic nerve changes suggestive of glaucoma and/or unreliable or insufficient visual field results were excluded from the study.

For their statistical analysis, the investigators evaluated dietary PUFA consumption as a continuous variable and in discrete quartiles. The presence of a glaucoma diagnosis was assessed in a binary fashion. Logistic regression modeling was used to assess the association between both general and subtype PUFA consumption and glaucoma diagnosis.

The study included more than 83,000 participants, and the prevalence of glaucoma in this group was found to be 3.7%. When analyzed as a continuous variable, total PUFA intake was not associated with a glaucoma diagnosis. Subtype analysis, however, revealed that higher daily dietary intake of either

EPA or DHA was associated with a lower likelihood of glaucoma diagnosis (OR = 0.06, 95% CI, 0.00–0.73 for EPA and OR = 0.06, 95% CI, 0.01–0.87 for DHA). When general PUFA intake was analyzed in terms of quartiles, consumption in the second and third quartiles was associated with an increased likelihood of a glaucoma diagnosis (OR = 2.84, 95% CI, 1.39–5.79 and OR = 2.97, 95% CI, 1.08–8.15, respectively).

DISCUSSION

Why might consuming specific omega-3 fatty acids reduce the likelihood of glaucoma diagnosis?

Basic science and animal studies have suggested that EPA and DHA may enhance blood flow and reduce blood viscosity, potentially protecting the optic nerve from glaucomatous damage. These substances may also modify the trabecular extracellular matrix in a beneficial manner.^{5,6}

Does the association between increased consumption of PUFAs and glaucoma contradict the potentially protective effect of specific omega-3 fatty acids?

Although higher levels of general PUFA consumption were associated with a higher glaucoma risk, specific EPA and

STUDY IN BRIEF

► In a cross-sectional population-based study, increased intake of the specific omega-3 fatty acids eicosapentaenoic acid and docosahexaenoic acid was found to be associated with decreased glaucoma risk.

WHY IT MATTERS

► No lifestyle or behavioral modifications have been found to definitively influence glaucoma risk. This study suggests that the intake of EPA and DHA in the setting of limited consumption of general polyunsaturated fatty acids may reduce glaucoma risk. Results from this study warrant further investigation for a causal relationship.

DHA subtypes were associated with a lower risk. These findings are not contradictory and suggest that an increasing proportion of omega-3 fatty acid intake with limited overall daily PUFA intake may be protective against glaucoma. ■

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