

# Alternative Medicine for Glaucoma

## Introduction

■ Alternative medicine is defined as those treatments and healthcare practices not taught widely in medical school, not used in hospitals and not usually reimbursed by Medicare or other insurance companies. Currently, more money is spent in the U.S. on alternative medicine than on prescription medications. Often these treatments have been poorly studied and little is known about their efficacy or side-effects. Alternative medical therapies are usually sold as food supplements and therefore fall outside of the regulation of the FDA. Because these treatments are sold without a prescription a misconception is promoted that they are somehow not pharmacologic agents and that they are without risks. This could not be farther from the truth. What follows here is some limited information about what is known about commonly used alternative medical treatments and their impact on the treatment of glaucoma.

## Vitamins & Supplements

■ Vitamin A – Vitamin A is a well studied essential nutrient that also has antioxidant properties. It has been clinically proven in the Age Related Eye Disease Study (AREDS) to reduce the rate of progression of age-related macular degeneration (the leading cause of legal blindness in the United States) in certain patients. However no studies to date have shown any reduction in intraocular pressure (IOP) in patients with glaucoma. Further, studies have shown no ability of Vitamin A to control IOP in rabbits with congenital glaucoma. Recommended dosing of Vitamin A is 10,000 IU per day. At doses more than 30,000 IU per day toxicity can ensue resulting in alopecia (hair loss), fatigue, headache, vertigo, increased intracranial pressure (elevated fluid pressure around the brain) and cirrhosis. Smokers should not take supplemental vitamin A because of an even greater risk of cancer.

■ Vitamin B12 – The role of Vitamin B12 in the treatment of glaucoma is unclear. Deficiency of Vitamin B12 can result in optic nerve disease similar to glaucoma. Two studies evaluating supplemental Vitamin B12 in patients with glaucoma have shown a possible benefit in stabilizing disease progression. These studies however were flawed in that they didn't rule out the possibility of a deficiency state in their sample population prior to initiating the treatment. Further studies are indicated. Recommended dosing is 100 mcg/day or as part of a Vitamin B complex. No toxicity has been documented.

■ Vitamin C – Vitamin C has been suggested as being of benefit in the management of glaucoma, however no studies have proven any benefit.

■ Vitamin E – Vitamin E has no known effect on IOP. Recent studies have shown that oral supplementation may have an anti-fibrotic effect (slows scar formation) and as such, Vitamin E may become an adjunctive therapy for glaucoma surgery.

Beyond this, Vitamin E appears to have no role in the management of glaucoma. Side effects of Vitamin E include impaired blood clotting and it may be advisable to discontinue use of Vitamin E prior to any surgery. The increased bleeding tendency is more common in patients already taking anticoagulants such as Coumadin and antiplatelet medications like aspirin. Patients taking these medications should speak with the managing physician about whether it is safe to take supplemental vitamin E.

- **Bilberry** – Bilberry has not been shown to lower IOP in studies. Further, studies of bilberry use have shown no improvement of visual function of any kind. Usual dosing is 60 – 160 mg three times daily or, in leaf form, one cup three times daily. Side effects include digestive complaints (nausea, diarrhea). Bilberry is known to interact with other medications including anticoagulants such as Coumadin (warfarin) and aspirin. Overdose of bilberry can result in cachexia (generalized wasting), anemia and icterus.
- **Ginkgo biloba** - The leaf of the maidenhair tree is the source of ginkgo biloba. It has been used for centuries in China and Western Europe. The most common preparation (EGb761) contains 24% ginkgo-flavone glycosides and 6% terpenoids as the active ingredients. The function of these ingredients is the inhibition of PAF (platelet activation factor). The normal function of PAF is to coordinate the formation of a blood clot. However excessive PAF activity can result in bronchoconstriction, increased vascular permeability and increased glutamate excitotoxicity resulting in brain injury. The properties of ginkgolide B include antioxidant and prolongation the life of endothelial derived relaxing factor which can theoretically improve optic nerve blood flow and blood vessel health in patients with glaucoma. Ginkgo however has side effects and drug interaction similar to bilberry.

## Diet

- **Caffeine** – It has been theorized that consumption of caffeine could raise IOP by increasing the amount of aqueous (fluid) production in the eye. Multiple studies however have shown either no increase or only a low increase in IOP (1.0 – 2.9 mm Hg) at caffeine doses of 200 – 400 mg. This would seem to indicate that consumption of caffeine at usual dietary levels probably has no significant impact on glaucoma. However, caffeine does have other systemic effects such as vasospasm (blood vessel constriction) and fluid retention.
- **Omega 3 Fatty Acids** – Omega-3 fatty acids are naturally found in fish oils. It has been suggested that diets high in omega 3 fatty acids may help in the management of glaucoma based on the observation that Inuit Indians (Eskimos – with a diet rich in fish oils) do not develop glaucoma. This observation however is confounded by genetics. Studies have also shown that topical application of end stage metabolic products of omega 3 fatty acids (prostaglandin E3 and D3) reduces IOP in rabbits. Human studies with supplemental omega 3 fatty acids

have demonstrated improved visual field and contrast sensitivity testing results. Further testing to establish efficacy, correct dosing, side effects and risk profile are needed.

- Total Caloric Intake – A study published in 1997 (Li, et al.) demonstrated a decreased rate of degeneration in aqueous collecting channels in mice placed on a calorie restricted diet. Though this may seem to have implications in the management of glaucoma, it may in fact reflect a delay in the aging process. An older study (1948) on humans fed a rice diet (low protein, high carbohydrate) demonstrated lower IOP in 11 of 12 patients. However, these patients developed other malnutrition related problems and no one included in the study population at the outset had glaucoma.

## Lifestyle

- Activities – Certain activities such as performing inverted yoga positions (where the head is lower than the heart) and playing high pressure wind instruments have been shown to significantly increase IOP (as much as a two fold increase in IOP) and should be avoided in patients with known or suspected glaucoma. It is important not to engage in forceful breath-holding in any activity (as is commonly and incorrectly done for example in weight lifting).
- Relaxation Techniques – It has been postulated that increased cortisol release from chronic physical or emotional stressors may deleteriously affect autonomic function (important in autoregulation of optic nerve blood flow). Studies linking stress to glaucoma however are inadequate and no study has demonstrated an effect of relaxation techniques or biofeedback on IOP.
- Smoking – It is widely believed by ophthalmologists that cigarette smoking - with its known roles in atherosclerosis, heart disease, stroke and hypertension - exacerbates glaucoma. And although population studies by Steward in 1994 and Pasquale in 2001 failed to show an association between smoking and elevated IOP or glaucoma, it is still recommended that patients with glaucoma not smoke because of the likelihood that smoking promotes more rapid disease progression.
- Cannabis (Marijuana) - The active ingredient in cannabis known to reduce IOP is  $\Delta^9$ -THC. Approximately 60-65% of people who smoke marijuana will have a reduction in IOP. The average reduction is 25% in those who respond. Although  $\Delta^9$ -THC can be isolated from the plant, the euphoric effects currently cannot be separated from the IOP lowering effect. Because of the rapid metabolism of the compound, it would have to be taken every 2 -3 hours throughout the day and night (the equivalent of 10 marijuana cigarettes per day or over 3,500 per year). Topical administration of  $\Delta^9$ -THC is currently ineffective in lowering IOP. The list of side effects from chronic use of marijuana is long including lung cancer, emphysema, decreased mental function, immune suppression, lowered blood pressure, increased pulse, diplopia, blurred near vision, chronic red eyes, and light

sensitivity. The most important side effect of marijuana relative to glaucoma management however is reduced blood pressure which can in fact exacerbate glaucoma. Current prescription glaucoma medications have greater efficacy, higher responder rates and markedly reduced systemic side effects when compared to marijuana which obviates any role for marijuana in the treatment of glaucoma.

### Concluding Remarks

- The role of alternative medicine in the management of diseases such as glaucoma is slowly being elucidated. There is however a tremendous amount that still is not understood. Always discuss with your physicians the alternative therapies that you're using especially in context with your prescription medications and diseases.
  
- Antioxidant vitamin supplements, ginkgo, and omega-3 fatty acids may be of benefit in the treatment of glaucoma provided overdosing and systemic drug interactions can be avoided. Smokers should avoid vitamin A. Smoking cessation is ideal. Stop vitamin E 2 weeks prior to surgery. Do not take bilberry or ginkgo if also using anticoagulants.