

# Nutrition and Acupuncture as an Adjunct Therapy for Ocular Inflammatory Disease

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# NUTRITION'S ROLE

Is it possible that an anti-inflammatory diet or appropriate supplements can assist conventional medicine in ocular inflammatory diseases and secondary conditions from side effects?

# Anti-inflammatory Diet and Uveitis

- Since uveitis is an inflammatory disease one theory is to avoid foods that promote inflammation.
- In general refined, high carbohydrate foods. High glycemic load foods. (as opposed to glycemic index)
- These cause an increase in insulin, higher CRP, promotion of free-radical production, more inflammation. Increase LDL, decrease HDL.

# Anti-inflammatory Diet

- So what are high glycemic load foods?....
  - Refined carbohydrates - white breads, 'enriched'
  - Soda, soft drink. Cakes/cookies, doughnuts
  - White potatoes
  - Crackers, chips, cereals

# Anti-inflammatory Diet

- In addition...Watch out for trans-fats...hidden everywhere...baked foods, store bought cakes/pastries, processed foods.
- Avoid Hydrogenated Oils! - These have many 'trans-fats'. Eliminate the purchase of fried foods.
- Instead use olive oil, coconut oil, butter, gourmet oils( macademia nut, grape seed).

# Anti-inflammatory Diet

- What is left to eat?!?.....
  - Whole grains, organic foods, lean meats, fatty fish, moderate alcohol
  - Vegetables/Fruits high in antioxidants...Red grapes, cherries, blueberries, raspberries, sweet potatoes, kale, collards, cabbage, broccoli, onions, garlic , tumeric, ginger
  - For occasional sweets or baked goods make your own or health food stores.

# Anti-inflammatory Diet

- **Refined carbs and ARMD.....** Tufts researchers examined eyes of 500 women between the ages of 53 and 73. The diets were assessed at intervals during a 10-year period preceding the eye examinations. After variable adjustment macular degeneration was found more frequently in women who favored less healthy carbohydrates, which cause artificial spikes in blood sugar. Women who ate healthier carbohydrates such as high-fiber fruits and vegetables were less likely to develop the eye disease. "...The types of carbohydrates being consumed were more important than the absolute amount,"

Chung-Jung C, et al, Dietary glycemic index and carbohydrate in relation to early age-related macular degeneration, *American Journal of Clinical Nutrition*, Vol. 83, No. 4, 880-886, April 2006

# Anti-inflammatory Diet

- The 'Mediterranean Diet' is an anti-inflammatory diet. *JAMA* published the effect of a Mediterranean diet on all-cause mortality in European Elderly subjects...
- 1507 healthy men 832 women between 70-90 yo studied between 1988 - 2000. Those that followed a Mediterranean diet and healthy lifestyle had a greater than 50% less mortality rate.

Knoops K, et al., Mediterranean Diet, Lifestyle Factors, and 10-Year Mortality in Elderly European Men and Women, *JAMA*. 2004;292:1433-1439



# Anti-inflammatory Diet

- Bottom line....if a drug company sold a pill that was shown to reduce chance of death by 50% it would fly off the shelves!
- A healthy diet has major benefits for our well-being, it can also help us live longer! It will not cure uveitis, but it probably will help you in other ways, especially in the long run.

# Curcumin & Uveitis

- Curcumin is the major phytochemical found in the spice Turmeric.
- Curcumin is one of the most widely studied phytochemicals that have been shown to be anti-tumor, anti-inflammatory, anti-arthritic.
- It has been shown to successfully control IBD (Crohn's & Colitis).

Deguchi Y, et al, Curcumin prevents the development of dextran sulfate Sodium (DSS)-induced experimental colitis., *Dig Dis Sci*. 2007 Nov;52(11):2993-8. Epub 2007 Apr 11

Sahl B, Curcumin attenuates DNB-induced murine colitis., *Am J Physiol Gastrointest Liver Physiol*. 2003 Jul;285(1):G235-43.

Ukil A, et al, Curcumin, the major component of food flavour turmeric, reduces mucosal injury in trinitrobenzene sulphonic acid-induced colitis., *Br J Pharmacol*. 2003 May;139(2):209-18.

# Curcumin & Uveitis

- 32 patients, 12 weeks. One group of 18 received curcumin alone. Another group of 14 were PPD positive and so received received curcumin and TB treatment. 375 mg TID.
- Results were comparable to corticosteroids but w/o any side effects. All patients favorable improvement to curcumin at 12 weeks.
- Lal, B et al., Efficacy of Curcumin in the Management of Chronic Anterior Uveitis *Phytother. Res.* 13, 318–322 (1999)

# Curcumin & Uveitis

- Turmeric has been used for thousands of years in Chinese and Ayurvedic medicine for inflammation.
- Bottom line... Curcumin can be a supplement to consider for uveitis that has uncontrolled inflammation. Especially if there are other comorbid symptoms such as IBD or other inflammatory diseases such as arthritis.

# Lutein & Zeaxanthin

- Anti-oxidant and anti-inflammatory carotenoids found in highest concentrations in the macula.
- Many studies shown for reducing age-related macular degeneration. But still controversial.
- Also shown to reduce UVB damage by 60%. So may help prevent cataracts. Chitchumroonchokchai C, et al, Xanthophylls and  $\alpha$ -Tocopherol Decrease UVB-Induced Lipid Peroxidation and Stress Signaling in Human Lens Epithelial Cells, *J. Nutr.* 2004 134: 3225-3232
- But what about Lutein and Zeaxanthin for ocular inflammatory diseases?....

# Lutein & Zeaxanthin

- One often cited study induced uveitis in rats and then injected Lutein 3x. The rats injected with lutein did not develop uveitis.
- Mechanism of lutein is probably an anti-inflammatory effect (reduction of NF-kB). However still no clear translation to humans with uveitis....
- What the study fails to mention is the dose converted to humans would be about 5-7 grams each time. (> 1000 cups of spinach and 1000 eggs).

Xue-Hai, J et al, Inhibitory Effects of Lutein on Endotoxin-Induced Uveitis in Lewis Rats, *Investigative Ophthalmology and Visual Science*. 2006;47:2562-2568.

# Lutein & Zeaxanthin

- Bottom line...Still eat your vegetables. They are good for you although may not always show a clinical result. Multitude of anti-aging benefits.
- Sources.... Dark, green leafy vegetables like kale, green leaf lettuce, and beet greens contain substantial amounts of both lutein and zeaxanthin.
- Egg yolks contain abundant lutein and zeaxanthin.
- Yellow & orange fruits or vegetables such as squash, peaches, sweet potatoes, and carrots.

# Antioxidants & Cataracts

- A study that induced uveitis in animal models and stimulated retinal damage found that antioxidants help prevent retinal damage and further inflammation. Rao, N, Role Of Oxygen Free Radicals in Retinal Damage Associated with Experimental Uveitis. *Tr Amer. Ophth Soc.* vol. LXXXVIII, 1990
- A review of research showing that high intakes of antioxidants can delay the development of cataract formation. “Optimal antioxidant intake can extend lens function.” Taylor A, Cataract: relationship between nutrition and oxidation, *Journal of the American College of Nutrition*, Vol 12(2): 138-146, 1993



# Antioxidants & Cataracts

- In regular users of multivitamin supplements, the risk of cataract was reduced by one third; in persons with higher plasma levels of vitamin E, the risk was reduced by approximately half. These are similar results to those obtained in an earlier case-control study. Leske C, et al, Antioxidant vitamins and nuclear opacities The longitudinal study of cataract, *Ophthalmology*, Volume 105, Issue 5, 1 May 1998, Pages 831-836

# Antioxidants & Uveitis

- A placebo controlled double masked study administered vitamin C 500 mg in combination with vitamin E 100 mg twice daily in 145 patients with acute anterior uveitis. No significant difference until the 8 week mark where visual acuity increased significantly in the treatment group.

Van Rooij J, et al, Oral vitamins C and E as additional treatment in patients with acute anterior uveitis: a randomised double masked study in 145 patients *Br J Ophthalmol.* 1999 November; 83(11): 1277–1282

# Antioxidants & Cataracts

- A 5 year population study of 30,000 Japanese men and women showed that those with the highest intake of Vitamin C had the lowest incidence of cataracts . Yoshida M Prospective study showing that dietary vitamin C reduced the risk of age-related cataracts in a middle-aged Japanese population. *Eur J Nutr.* 2007 Mar;46(2):118-24
- 2,594 Australians in a 5 year follow-up study found those with the highest dietary intake of lutein and zeaxanthin had a significantly lower prevalence of cataracts. Vu HT, et al. Lutein and zeaxanthin and the risk of cataract: the Melbourne visual impairment project., *Invest Ophthalmol Vis Sci.* 2006 Sep; 47(9):3783-6

# Antioxidants

- Bottom line...Antioxidants may help reduce the incidence of cataracts and may help some cases of uveitis. It may also help slow the progression of disease.
- Probably best to get antioxidants from food or whole food supplements. (green supplements, or companies that make whole food vitamins). I prefer that to taking artificially large bolus of synthetic supplements. (i.e. too much Riboflavin over 50mg has been implicated in causing cataracts).

# Omega-3 & Glaucoma

- Few studies that give conflicting results...
- In a study w/rats the ones fed a higher omega-3 diet had significantly lower induced IOP. Researchers conclude that omega-3 may play a role in regulating glaucoma. Nguyen C, et al, Dietary Omega 3 Fatty Acids Decrease Intraocular Pressure with Age by Increasing Aqueous Outflow, *Investigative Ophthalmology and Visual Science*. 2007;48:756-762
- Another study looking at open-angle glaucoma found that a higher omega3:omega6 ratio increased glaucoma risk. Kang J, et al, Dietary fat consumption and primary open-angle glaucoma, *American Journal of Clinical Nutrition*, Vol. 79, No. 5, 755-764, May 2004

# Omega-3 & Glaucoma

- What does this tell us...
  - Fish oil or other omega-3 are not a viable therapy for glaucoma.
  - But, neither are foods fried in corn-oil or other oils.
- Bottom line... still eat a balanced meal of adequate Omega-3 oils from fish, flax, walnuts. However supplementing with what is beyond normal diet is not warranted for glaucoma.

# Fish Oils & Ocular Inflammation

- Comparison of effects of fish oil versus corn oil dietary supplements on two rabbit models with induced uveitis. Fish oils decreased blood inflammation markers. However ocular inflammation wasn't altered in a clinically significant manner.

Rubin RM et al, Effects of a fish oil dietary supplement on endotoxin-induced ocular inflammation. *J-Ocul-Pharmacol.* 1988 Fall; 4(3): 259-67

# Fish Oils & Ocular Inflammation

- Cannot make a broad recommendation to use fish oils to reduce inflammation in uveitis.
- Perhaps some uveitis etiologies fish oils may be beneficial.
- Perhaps they are just bad studies. (i.e. Rabbits don't eat fish)
- Maybe with longer term use fish oils have a role in autoimmune diseases.....



# Fish Oils and Autoimmunity

- A review study published in 2002 looked at Omega-3 supplementation and autoimmune diseases. It was found that for some autoimmune diseases fish oils can down-regulate the immune system thereby slowing or preventing disease progression. Ergas D, et al, n-3 Fatty Acids and the Immune System in Autoimmunity, *IMAJ*, 2002 4:34-38
- Bottom line...Fish oils can act as an immunosuppressant. It can be possible therapy for uveitis with certain autoimmune etiologies.

# Vitamin D & Autoimmunity

- Vitamin D has was called the “Vitamin of the year” in 2006. It is actually a hormone and a deficiency has been implicated in a wide variety of autoimmune disorders....
- MS, Lupus, RA, Lyme arthritis, IBD.

# Vitamin D & Autoimmunity

Ginanjar E., et al, Vitamin d and autoimmune disease., *Acta Med Indones.* 2007 Oct–Dec;39(3):133–41

Cantorna MT., Vitamin D and its role in immunology: multiple sclerosis, and inflammatory bowel disease A Review, *Prog Biophys Mol Biol.* 2006 Sep;92(1):60-4

Villamor E, A potential role for vitamin D on HIV infection? *Nutr Rev.* 2006 May;64(5 Pt 1):226-33

Chen S, Modulatory effects of 1,25-dihydroxyvitamin D3 on human B cell differentiation. *J Immunol.* 2007 Aug 1;179(3):1634-47

Kamen DL et al, Vitamin D deficiency in systemic lupus erythematosus., *Autoimmun Rev.* 2006 Feb;5(2):114-7

Cantorna MT, et al, Vitamin D status, 1,25-dihydroxyvitamin D3, and the immune system, *Am J Clin Nutr.* 2004 Dec;80(6 Suppl):1717S-20S

Deluca HF, et al, Vitamin D: its role and uses in immunology., *FASEB J.* 2001 Dec;15(14):2579-85

# Vitamin D & Autoimmunity

- Bottom line...If you suspect any autoimmune condition ask your MD to check your Vitamin D levels. This is especially true if it is an autoimmune disease implicated in low D status.
- Labs state 20ng/ml is low-adequate, but cutting-edge alternative MDs say it should be 30-40ng/ml minimum. The fall should have the highest levels of the year.

# Food Sensitivities/ Allergies & Uveitis

- 2 case studies of IgE mediated allergy diseases combined with uveitis. Amer R, Uveitis associated with immunoglobulin E-mediated allergic diseases *Clin Experiment Ophthalmol.* 2007 Sep-Oct;35(7):677-8

Chao I T, Hsu C H, Wong W Y. Chronic uveitis due to sensitivity to common foods. *Chin Med J* 1964; 11: 220

# Food Sensitivities and Inflammatory Diseases

- It is known that Type 2 or Type 3 reactions can cause fibromyalgia, IBD, migraines.
- These are delayed immune responses not IgE that are classified as true food allergy. These are cell mediated or complement and often do not occur together.
- Taking patients off offending foods has a dramatic effect in symptom improvements for IBD, migraines, IBS and fibromyalgia.
- Question...Is it possible that these delayed food sensitivities can be playing a significant role in uveitis for some patients?

# Acupuncture & Chinese Medicine

What does it offer for ocular diseases?



# ACUPUNCTURE

- Acupuncture is one arm of what is known as “Traditional Chinese Medicine” (TCM) or “Traditional Oriental Medicine”
- Records of medicine in China date back to over 3000 years ago and in India 5000 years old.



# Traditional Chinese Medicine (TCM) includes....

- Herbal Medicine
- Acupuncture
  - Moxibustion
  - Cupping
  - Electro-acupuncture
  - Gua-Sha

# Traditional Chinese Medicine (TCM) includes....

- Nutrition Therapy
- Massage (TuiNa, Shiatsu, Amma)
- Life-style (Meditation, Exercise, QiGong)

# Acupuncture - Origins

- Over 2000 years old in China. In West earliest record is 1671 in a French medical journal. Used widespread in Europe and East coast of USA in 19th century.
- Strong traditions in Japan, Taiwan, Korea, Vietnam, Germany, France.

# Acupuncture Styles

- Chinese, Japanese, French, German Styles of Acupuncture
- Within each 'style' there are hundreds of 'sub-styles'.
- Micro system acupuncture
  - Auricular, Korean Hand, Scalp

# Acupuncture in USA

- Licensing in almost every state.
- 3-4 years of school.
- Most prevalent style is from China known as Traditional Chinese Medicine - TCM
- Look for a Licensed Acupuncturist - LicAc, LAc, DOM

# Chinese Medicine Diagnosis

- How do we know where to stick the needles?

# Chinese Medicine

## Diagnosis

- Diagnosis is based on an individual's pattern rather than western disease.
- Use pulse, tongue, abdominal palpation, asking questions & talking.
- Treatments are individualized to a person's pattern rather than a named 'disease'.
- Many diseases one treatment, one disease many treatments.

# Acupuncture - How Does it work?

- From a TCM theory point of view....
  - *Qi* or energy flow through 'meridians' in body. Meridians are connected to internal organs.
  - Acupuncture regulates the *Qi* in the meridians to flow smoothly
  - It is how the point combinations are used that makes for an effective treatment.



# Acupuncture - How Does it work?

- From a Western point of view still being heavily researched.....
  - Chemical messaging through fascia.
  - Viscero/Somatic mapping.
  - The nervous system - affecting the brain's perception. Gate control theory.
  - Hormonal regulation. Endorphins.
  - Majority of acupuncture points are located at boundaries between muscles or connective tissue

# Acupuncture & Modern EBM Research

- Current model of blinded Randomized Control Trial doesn't fit for acupuncture. Yet.
- How do you administer placebo acupuncture? Hasn't been figured out.
- How do you blind practitioners?
- The most effective acupuncture treatments are individualized..One disease many treatments.

# Acupuncture & Modern EBM Research

Recent article from Cochrane database review concluded, *“We found no randomized clinical trials [for glaucoma] and subsequently no meta-analysis was conducted. Evidence was limited to a few case series of small sample size. At this time, it is impossible to draw reliable conclusions from the available data to support the use of acupuncture for the treatment of glaucoma....the clinical practice decisions will have to be based on physician judgement and patients' value given this lack of data in the literature.”*

Law S, Acupuncture for glaucoma. *Cochrane Database Syst Rev.* 2007 Oct 17;(4)

# Acupuncture & Modern EBM Research

- However...there are no 'gold-standard' RCTs because we haven't figured out how to do it with acupuncture.
- There are over 2000 years of recorded data of eye pathologies treated with acupuncture and herbal medicine. We cannot ignore this or the clinical results we see!
- The terminology is completely different but we are describing the same disease. In Chinese medicine glaucoma may be described as *Liver Yin Def*, or *Qi Stagnation*, or *Liver Wind*, or *Liver Yang Rising*, or *Gallbladder Heat*, or *Kidney Yin Def*...

# Liver & eyes

- TCM theory the liver “opens to the eyes” thus often see liver disharmonies manifesting as ocular diseases such as conjunctivitis, dry-eyes, glaucoma etc.

# Acupuncture & Eye Care

- Has been shown clinically to be useful in treating a wide range of visual conditions:
  - Glaucoma
  - Cataracts
  - Macular Degeneration
  - Optic Atrophy
  - Ocular inflammation
  - Dry Eyes
  - Pain

# Acupuncture & Ophthalmology

- 50 people w/ glaucoma, retinitis pigmentosa, or optic nerve atrophy age 5 to 71 yo. Same treatment used for all patients, points around the eyes and distal eye points as well as electro-acupuncture. All patients had an improvement in visual acuity. Retinitis pigmentosa patients showed an enlargement of visual field borders. Glaucoma patients had a reduction in IOP.

Dabov S, et al, Clinical application of acupuncture in ophthalmology, *Acupunct Electrother Research*. 1985;10(1-2):79-93.

# Acupuncture IOP & Glaucoma

- 11 patients w/Glaucoma tx w/acupuncture 2x/week for 5 weeks. IOP and uncorrected visual acuity significantly improved at 15 mins, weekly and at end of study. Kurusu M, et al, Acupuncture for Patients with Glaucoma, *Explore*, 2005 Sep;1(5): 372-6. PMID: 16781568
- 18 patients received one acupuncture treatment. IOP taken 15 mins before, 15 mins after and 24 hours after. Decrease of IOP (-2.67) at 15 mins and (-2.5) at 24 hrs. Uhrig S, et al, Standardized acupuncture therapy in patients with ocular hypertension or glaucoma, *Forsch Komplementarmed Klass Naturheilkd*. 2003 Oct;10(5):256-61 PMID: 14605482



# Acupuncture IOP & Glaucoma

- Rats were induced with glaucoma using laser. 3 groups studied - a control group, a low frequency electroacupuncture (EA) and a high frequency EA group. The low frequency EA group showed significant neuroprotection of retinal function. Chan HH, et al, Electroacupuncture provides a new approach to neuroprotection in rats with induced glaucoma, *J Altern Complement Med.* 2005 Apr;11(2): 315-22

# Acupuncture & Dry Eyes

- Case studies of Xerophthalmia (dry eyes) of head/neck cancer patients and Sjogren's syndrome. Age range 35-72yo. All patients had satisfactory relief but maintenance acupuncture was required every 2-4 weeks in most cases. Niemtzow et al, Acupuncture For Xerophthalmia, *Medical Acupuncture A Journal For Physicians By Physicians*, 13(3) 2002

# Acupuncture & Ophthalmologic Pain

- Case study looked at pain from glaucoma, ophthalmic migraine, and dry eyes. Individualized treatments. Significant reduction in pain ( $p < .05$ ). Suggested mechanism is endorphin production inhibiting pain perception.

Nepp, J et al, Is acupuncture an useful tool for pain-treatment in ophthalmology?, *Acupunct Electrother Res.* 2002;27(3-4):171-82

# Acupuncture & Inflammation

- Acupuncture can have a modulating effect on inflammation. A review article suggested that acupuncture can down-regulate the innate immune system by inhibiting pro-inflammatory cytokines. “...the use of acupuncture...for a number of chronic inflammatory and autoimmune diseases seems plausible...”

Kavoussi B The neuroimmune basis of anti-inflammatory acupuncture, *Integr Cancer Ther.* 2007 Sep;6(3):251-7

# Acupuncture & Inflammation

- Rats induced with inflammation and acupuncture administered on ST36 30 minutes after induction. Inhibited 3 inflammatory cytokines and markedly reduced edema compared to control group.

Chae Y, Protein array analysis of cytokine levels on the action of acupuncture in carrageenan-induced inflammation. *Neurol Res.* 2007;29 Suppl 1:S55-8.

# Acupuncture & Inflammation

- 4 experiments on rats induced with inflammation. Low frequency electroacupuncture suppressed inflammation by stimulating HPA axis. Corticosterone did not increase in healthy rats only those with pathologies.

Zhang et al, Electroacupuncture attenuates inflammation in a rat model. *J Altern Complement Med.* 2005 Feb;11(1):135-42

Li et al, Corticosterone mediates electroacupuncture-produced anti-edema in a rat model of inflammation. *BMC Complement Altern Med.* 2007 Aug 14;7:27

# Acupuncture & Autoimmune

- Can help bring body into homeostasis (balance).
- Acupuncture will regulate the body in the direction it needs to go. Will upregulate or downregulate using same treatment with different pathologies. Adaptogenic.
- A plethora of case studies discussing the successful treatments w/ IBD, fibromyalgia, RA, SLE.

# Acupuncture & Medication Side Effects

- Low dose methotrexate not the side effects of high dose chemo tx...
- However acupuncture has been proven to be powerful for high dose methotrexate side effects in cancer therapies. Multitude of studies confirm acupuncture's effectiveness.



# Herbs for the eyes

- For inflammation of eyes try Chrysanthemum (*Ju Hua*), Eyebright, Goji berries (*Gou Qi Zi*) in a tea.

# Conclusion

- Both nutritional therapy and Chinese Medicine can provide successful adjunct treatments for ocular diseases.
- They may help attenuate some of the inflammatory, oxidative and autoimmune responses.
- What is an appropriate treatment for one person may not be proper for another person. Individual treatments are the best approach.

# Thank you!

