



Integrative approach to allergy and asthma using complementary and alternative medicine

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Although complementary and alternative medicine (CAM) is greatly popular in the world, the specific modalities used are most important in how they relate to the individual patient and the population served. What is considered CAM in the United States may be considered mainstream therapy or accepted folklore medicine in other countries and cultures. Use of an approach to patient care that incorporates the patient's belief system is important for building a strong patient-practitioner relationship.

CAM practices in the United States have increased during the last several years in both reported use and annual out-of-pocket expenditure. More than 70% of the US population has used CAM at least once and has spent close to \$34 billion annually for CAM products and services.¹ Because there is such public interest in CAM use, it is important for health care professionals to be aware of patient use. Furthermore, modalities considered CAM currently may well be incorporated into conventional medicine later given scientific substantiation.

Although there are many effective conventional treatments for allergies and asthma, people continue to seek CAM methods of treatment because of lack of symptom control, therapy adverse effects, or access and cost of medications.² Whatever the reasons may be, it is important to know about these CAM modalities, their evidence basis for safety and efficacy, adverse effects, and drug-CAM interactions. In addition, we should always keep in mind *primum non nocere*—first, do no harm. Ever mindful of the placebo effect of any positive action, we should keep the psychophysiological benefits as a resourceful tool for patient care and monitor the effects of the CAM modalities separately. Personality characteristics may help identify those who may be responders to integrative or lifestyle approaches.³

Interest in CAM at our office was spurred by the proliferation of alternative practices moving into our medical office building and competing for our patients with allergies. Surveys in our office of patients' preferences have been tallied for more than 10 years with regard to CAM uses and preferences. Approximately two-thirds of

our patients wanted to discuss CAM use in a medical setting, and increasing numbers of patients were seeking CAM.⁴ We approach CAM in an integrative manner to tailor patient care of allergies and asthma, integrating complementary modalities with evidence-based recommendations within a conventional Western practice. Use of an integrative approach allows us to address our patients' physical and emotional needs for optimal health and wellness and encourages us to be “compleat physicians.”

As allopathically trained health care practitioners, the arena of CAM often feels daunting. However, resources are available for allergist-immunologists to discuss how to approach patients seeking CAM and how to explore CAM methods.⁵

Although there are numerous modalities that comprise CAM, they can be “grouped into broad categories, such as natural products, mind and body medicine, and manipulative and body-based practices,” as per the National Center for Complementary and Alternative Medicine at the National Institutes of Health.⁶ We briefly discuss components of these CAM categories and an additional category (lifestyle) that we consider important when caring for the whole person and have included our patient hand-out in Table 1.

Natural Products

Natural products include vitamin and mineral supplements, probiotics, and herbal or botanical supplements. Herbal supplements were used in prehistoric times⁶ and encompass the most used component of CAM in the United States, according to the most recent National Health Statistics Reports in 2007.⁷

Supplementation with antioxidants have aimed at augmenting a patient's ability to negate the effects of free radical damage, given that patients with asthma have decreased levels of circulating antioxidants, rendering them more susceptible to the damaging effects of oxidative stress. This disparity is even greater, depending on the severity and level of asthma control.⁸ Observational studies have indicated that dietary levels of vitamins, minerals and fatty acids have an association with allergic diseases. Supplementation with these vitamins, minerals, and fatty acids has had variable outcomes in disease modification or prevention.

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The role of vitamin D has received great attention recently with respect to allergic diseases and immunomodulatory properties. Vitamin D has been found to have abundant cytokine-modulating effects, including decreasing T_H1 and T_H2 proliferation and decreasing activity of interleukin 2.⁹ Multiple studies have investigated correlations between atopic disease and vitamin D levels. The timing and dosing of vitamin D may prove to be important factors. Vitamin D status in utero may have associations with allergic outcomes.¹⁰

In children, low serum levels of vitamin D have correlated with increased atopy and asthma, with elevated total IgE levels and eosinophil counts.¹¹ Supplementation with vitamin D has been helpful. Low vitamin D levels in adults were associated with lower lung function, increased bronchial hyperresponsiveness, and decreased glucocorticoid responsiveness.¹²

There is conflicting evidence regarding the efficacy of supplemental vitamin C in the treatment of asthma and allergic rhinitis (AR). Higher levels of vitamin C are associated with lower incidence of asthma in children.¹³ However, the Cochrane database found “insufficient” evidence to recommend vitamin C supplementation for asthma.¹⁴ Supplementation with vitamin C for exercise-induced bronchoconstriction has shown benefit,¹⁵ with a recent meta-analysis on vitamin C and exercise-induced bronchoconstriction indicating that almost half of the participants had a reduced decrease (mean, 8.4%) in postexercise forced expiratory volume in 1 second after vitamin C supplementation.¹⁶

There have been variable reports on the effect of vitamin E on atopy, with different isotopes a compounding factor.¹⁷ A study of atopic asthmatic patients ingesting a natural-source d- α -tocopheryl acetate indicated that bronchoalveolar lavage before and after treatment showed reduction of oxidant stress and airway hyperresponsiveness to methacholine.¹⁸

Probiotics have been found to have protective effects against atopic eczema for the first 7 years of life. *Lactobacillus rhamnosus* strain GG given in pregnancy and infancy provided protection against the development of atopic eczema.^{19,20} Supplementation with probiotics decreased the annual number of rhinitis episodes and improved quality of life (QOL) scores.²¹ A World Allergy Organization Special Committee on Food Allergy and Nutrition concluded that the research is still in its infancy and there is no proven role for probiotics for treatment and prevention of allergy at this time.²² However, recent meta-analysis investigating the use of probiotics for primary prevention of allergies and asthma in infants demonstrated reduced total IgE levels and that the longer the follow-up time the more prominent the protective effect. Both timing and strains of probiotics used are associated with variable results. The combination of prenatal and postnatal administration of probiotics significantly reduced atopic sensitization by positive prick test results, but postnatal ingestion alone was not significantly protective.²³

Fish, fish oil, and ω 3-fatty acids, which have anti-inflammatory properties, were investigated for both treatment and prevention of asthma and atopy. A prospective birth cohort study evaluated fish intake during pregnancy and infancy monitoring for asthma and eczema at 2 years of age. Infant but not maternal intake of any type of fish at least once a week was protective in preventing eczema but not asthma.²⁴ A Cochrane review of marine fatty acids for asthma determined that there was little evidence to recommend supplementation with fish oil, but conversely there was no evidence of risk.²⁵

Potentially Effective Herbal Remedies for Asthma and Allergy

Asthma

Caffeine has been studied as a bronchodilator because theophylline is a metabolite.²⁶ Evaluated in a small study in

exercise-induced asthma, caffeine was equally effective as albuterol in reducing postexercise forced expiratory volume in 1 second decline.²⁷ A Cochrane review of caffeine for asthma treatment concluded that it appears to have a modest, short-term effect on airway function and may need to be avoided 4 hours before lung function testing but did not appear to affect exhaled nitric oxide.²⁸

Although some data suggests choline, magnesium, and *Pinus pinaster* pine bark (Pycnogenol) may be helpful in managing asthma, we are not currently using these products in our practice. Choline supplementation was found to decrease asthma symptoms, reduce medication use, and produce anti-inflammatory effects.²⁹ Magnesium has been considered in asthma treatment in both oral and inhaled forms, but there is contradictory evidence regarding its efficacy.³⁰ For severe acute exacerbations there may be a role for inhaled magnesium sulfate as an adjunct to standard treatment.³¹ A bioflavonoid extract from the *Pinus pinaster* tree bark (Pycnogenol) was studied in pediatric patients with mild to moderate asthma, and as an adjunct, it demonstrated decreased asthma symptoms and rescue inhaler use, improved pulmonary function, and decreased urinary leukotriene levels.³²

Allergic Rhinitis

Butterbur (*Petasites hybridus*) has been studied as a treatment for AR with variable results. One study demonstrated a decrease in nasal resistance after 5 days of taking butterbur along with improved day and night nasal symptoms and QOL scores.³³ Another study comparing butterbur to cetirizine found similar results for relief of seasonal allergic rhinitis symptoms,³⁴ whereas another found no improvement over placebo.³⁵

Capsaicin has been evaluated in patients with allergic and nonallergic rhinitis. Intranasal capsaicin acts in blocking neuropeptides, preventing axon reflex on the sensory nerves in the mucosa of the upper airway. A Cochrane review of treatment of AR with capsaicin stated that there was insufficient evidence to evaluate its use.³⁶ However, a randomized, double-blind, parallel trial evaluating a capsaicin nasal spray (Sinus Buster; Buster Brands, Healthcare Products, a division of Hi-Tech Pharmacal, Co Inc, Amityville, New York) vs placebo was found to significantly decrease total nasal symptom scores during 2 weeks in patients with nonallergic rhinitis.³⁷

Mind-Body Interventions

Mind-body interventions use techniques that engage the mind's ability to affect physical functions and symptoms. Meditation, yoga, breathing techniques and mindfulness-based stress reduction, and behavioral interventions, such as self-management training, journaling, patient support groups, and cognitive-behavioral therapy, are examples that have been studied in asthma.

There is variability in the studies on the effect of yoga on asthma. Yoga training as an adjunct in asthma management produced significantly increased QOL scores, and some studies were also associated with improvement in pulmonary function test results.³⁸ A randomized controlled trial of yoga intervention with a stretching control group found no significant differences.³⁹ A review of a randomized controlled trial of yoga for asthma management concluded that yoga does not relieve asthma symptoms based on the current literature.⁴⁰ However, yoga is unlikely to have adverse effects and in some studies appears to have benefit, at least in QOL for asthma management.

Studies that have assessed the addition of breathing exercises for asthma management indicate that there may be added benefit with the Buteyko Breathing Technique⁴¹ and with the Papworth Method (a combined breathing and relaxation program).⁴²

A review of relaxation therapies for asthma, including progressive muscle relaxation, hypnotherapy, autogenic training, biofeedback training, and transcendental meditation, did not

Table 1
Integrative medicine for allergic rhinitis

Lifestyle Approaches:

Nutrition:

• **Avoidance:**

- Remove fast food, processed and preserved foods
- Trial of minimizing dairy and wheat

• **Enhancement:**

◦ **Nutrition**

- Increase fresh fruits and vegetables! VERY IMPORTANT!!
 - Foods with ω 3-fatty acids (ie, cold water fish, such as salmon and mackerel)
 - Yogurt, kefir, or dairy-free coconut kefir (eg, GoodBelly [GoodBelly; NextFoods, Boulder, Colorado], probiotics with live cultures)
- **Vitamins/Supplements**
- Probiotics: *Lactobacillus* GG, pregnancy/infants, 1–10 billion units e to 4 times per day 2–4 weeks before delivery and continue 3–6 months during breastfeeding (eg, Culturelle [i-Health, Inc/Culturelle, Cromwell, Connecticut])
 - Vitamin D: $\geq 2,000$ IU every day (check serum levels first)
 - Vitamin C: $\geq 1,000$ mg every day, increase if needed

Exercise:

- Moderate-intensity exercise may be helpful to decrease symptoms
- Try some steam afterward; consider adding eucalyptus

Biomechanical Therapies:

- Nasal/diaphragmatic breathing relaxation exercises daily, yoga style
 - For example, nasal breathing exercise: deep inspiration, followed by expiration through one nostril, while blocking the other nostril with finger on outer nose and producing an “hmm” or “om: sound while breathing out and repeat on other side. Complete 5 times on both sides
- Consider yoga

Mind-Body Interventions:

- **Mental-Emotional-Social-Spiritual Health**
- **Stress Reduction:** Increased stress levels may increase allergic responses. Activities that lower stress levels may not only have general health benefit but may also improve quality of life specifically related to allergic diseases.
 - Examples of stress reduction activities include yoga, mindfulness-based stress reduction, exercise, meditation, and laughter.

• **Mind-Body: RELAX!**

Environment:

- Nasal saline: NeilMed Sinus Rinse, NasaMist (NeilMed, Santa Rosa, California), Simply Saline (Arm & Hammer; Church & Dwight CO, Inc, Princeton, New Jersey)
- Avoidance of known triggers
- Humidity
- HEPA filter: Costs will vary based on the size of the room the filter is designed to clean and on how loud the motor is for the HEPA filter.

Manipulative and Body-Based Practices

- Acupressure: Ear acupressure may be helpful; studies limited but show some promise. Sinus acupressure a consideration.
- Acupuncture: Studies were associated with improved quality of life but were not shown to be cost-effective.
- Chiropractic: There is insufficient evidence to show benefit with chiropractic care and allergic rhinitis.
- Traditional Chinese Medicine: Multiple formulations are currently under investigation.

Common Natural Supplements for Allergic Rhinitis:

- Butterbur (*Petasites hybridus*): leaf extract dose, 8 mg 3 times per day; whole root extract dose, 50 mg 2 times per day.
CAUTION: MAY NOT BE APPROPRIATE FOR PATIENTS WHO ARE RAGWEED ALLERGIC.
- Quercetin: 500 mg once per day to 2 times per day
- Capsaicin: (eg, Sinus Buster capsaicin nasal spray), 1 spray each nostril twice daily, improved nasal congestion, sinus pain and pressure, and headache in 2-week trial.
- Grape seed extract (*Vitis vinifera*): popular but efficacy questionable.

Natural Medicines That Are Not Encouraged

- Stinging nettle leaf extract (*Urtica dioica*)
CAUTIONS: MAY INTERFERE WITH WARFARIN
- Pycnogenol (*Pinus pinaster*)
CAUTION: Not recommended for patients with autoimmune disorders
- Cat's claw (*Uncaria guianensis*, *Uncaria tomentosa*)
- Goldenseal (*Hydrastis canadensis*)
- Methylsulfonylmethane
- Spirulina (*Spirulina spp*), concerns about contamination

Natural Medicines That Are DISCOURAGED!

- Bitter orange (*Citrus aurantium*): case reports of adverse cardiac effects
- Ephedra (*Ephedra spp*): FDA ban in the United States for life-threatening adverse effects

Abbreviations: FDA, Food and Drug Administration; HEPA, high-efficiency particulate absorption.

reveal conclusive benefit for asthma treatment.⁴³ However, mindfulness-based stress reduction in adults with persistent asthma persistently and significantly improved asthma QOL questionnaire scores for at least 1 year.⁴⁴ Cognitive behavioral intervention was studied in adults with asthma and anxiety complications, demonstrating significant improvement in their asthma-related fear that persisted for at least 6 months, but costs were not reduced.⁴⁵

Acupuncture is included in mind-body medicine and is one of the world's oldest therapeutic practices. It has multiple components: energy medicine, manipulative and body-based practices, and a fundamental constituent of Traditional Chinese Medicine (TCM).⁶ There is bidirectional communication between the

neuro-endocrine-immune system through both peripheral circulation of hormones, neurotransmitters, neuropeptides, and innervation of lymphoid organs, which is referred to as the neurocrine-immunologic network.⁴⁶ Acupuncture is used for asthma and AR^{47–50} and appears to have anti-inflammatory effects, mediated by sympathetic and parasympathetic pathways as a part of the neuroendocrine-immunologic network and may be useful as an adjunct treatment for allergic asthma.^{48,51} A multicenter, randomized, parallel-controlled study of AR patients indicated significant improvement in total nasal symptom scores in acupuncture patients compared with both sham acupuncture and control groups.⁴⁹ A recent multicenter randomized controlled trial of acupuncture for the treatment of seasonal allergic rhinitis

indicated that patients had improved Rhinitis Quality of Life Questionnaire scores compared with sham acupuncture and control patients.⁵⁰ Additional study of these patients indicated that although acupuncture was associated with QOL improvements, it was not cost-effective.⁴⁷

Studies in mind-body treatments are inherently complicated, and it appears that studies evaluating QOL measures instead of lung function or medication changes have had more positive results with no adverse events. When these methods of asthma management are added to standard asthma treatment and not used in their place, QOL benefits are likely. Further studies regarding financial implications compared with QOL improvements are important considerations for health care benefits. However, most mind-body treatments are out-of-pocket expenses, and individual choice may drive cost vs personal benefits.

Manipulative and Body-Based Methods

Manipulative and body-based therapeutic methods focusing on body systems and structures include spinal manipulation and massage therapy. In 2007, their use ranked in the top 10.⁶

There are few quality studies to support the use of chiropractic care for patients with asthma. A Cochrane review of manual therapy for asthma indicated that there was insufficient evidence to support its use.⁵²

Alternative Medical Systems

Whole medical systems are complete systems of theory and practice that have evolved over time in different cultures apart from conventional or Western medicine. Examples of ancient whole medical systems include Ayurvedic medicine and TCM. More modern systems that have developed in the past few centuries include homeopathy and naturopathy.⁶ Given the immune substantiation, we shall only further discuss TCM.

Traditional Chinese Medicine

TCM has been practiced for more than 5,000 years, integrating herbal therapy, acupuncture, acupressure and massage, mind-body therapy, and dietary therapy. The central philosophy of TCM varies significantly from that of Western medicine because the human is regarded as a microcosm of the universe and is intertwined within the 5 elements of the universe, including fire, earth, metal, water, and wood. TCM also regards the human body as an integrated system composed of individual organs and tissues that are interdependent on one another. In TCM, a vital energy, qi, flows through meridians and must be balanced to maintain well-being. In addition, TCM works through the concept of yin-yang theory, where 2 opposing but complementary forces must be balanced to maintain health. Therefore, balance between each component in the body and the universe is essential for maintaining health.⁶

Chinese herbal medicine, one of the main components of TCM, uses extracts of plants, minerals, and animal products combined into formulas provided as teas, capsules, tinctures, or powders. Specific TCM herbal interventions are being studied, yielding exciting results for atopic disorders.

The herbal formula antiasthma herbal medicine intervention is an innovative Chinese herbal formula that contains ling-zhi (*Ganoderma lucidum*), ku-shen (*Sophora flavescens*), and gan-cao (*Glycyrrhiza uralensis*). This formulation is a simplified version of a 14-herb TCM treatment preparation and has clinical evidence of benefit in asthma treatment. The antiasthma herbal medicine intervention has been found to reduce use of rescue inhalers, suppress IgE and T_H2 responses, decrease interferon γ and cortisol levels, and improve lung functions without causing adrenal suppression when compared with treatment with inhaled steroids, while being safe and well tolerated.^{53,54}

TCM and Food Allergy Herbal Formula-2 are currently being investigated in human clinical trials for their safety profile and efficacy in treating food allergies. Food Allergy Herbal Formula-2 has been effective in blocking even peanut-induced anaphylaxis in animal models.⁵⁵

Lifestyle

There is a strong connection with psychological stress and asthma. Studies examining maternal psychological stress, both in utero⁵⁶ and in early childhood, were associated with increased future development of asthma.⁵⁷ The pathophysiology of psychological stressors and asthma is believed to be connected with the neuroendocrine pathway. Studies demonstrate that stress causes changes in immune regulation, including a shift from type 1 to type 2 cytokine predominance.⁵⁸ In addition, both vagal excitation and ventilation effects are involved as likely physiologic pathways between stress and asthma.^{58,59} We know that stress and anxiety can increase the skin tests wheal response and therefore may enhance and prolong allergic symptoms.⁶⁰ Stress also increases morbidity in asthma patients and therefore is an important factor to address when treating our patients.⁶¹ Mind-body therapies are powerful tools for stress management.

Diet may also play a modifiable role in atopy. A Mediterranean-type diet in pregnancy has been protective of future wheezing in offspring in some studies⁶² but not in others.⁶³ A Mediterranean diet has been found to be protective for wheezing independent from exercise and obesity.⁶⁴ Children and adolescents who ate fast food more than 3 times per week had increased risk of severe asthma, rhinoconjunctivitis, and eczema, whereas those who had more than 3 servings of fruit a week were less likely to have severe asthma.⁶⁵ Cold water fish, such as salmon and mackerel, are often recommended as anti-inflammatory in the diet. Trials of minimizing dairy and wheat may be used, whereas augmentation of fruit⁶⁵ and vegetables is encouraged and substantiated.

We encourage our patients with stable asthma to do cardiopulmonary exercise regularly. A Cochrane review of physical training for asthma indicated that maximum oxygen uptake improved and exercise was well tolerated without any adverse effects. QOL also significantly improved for those exercising with asthma in 4 of 5 reviewed studies.⁶⁶ Murine models demonstrate reduced remodeling and airway inflammation with low to moderate aerobic exercise.⁶⁷

Conclusion

As evidence supportive and against specific CAM modalities is generated, the role of these approaches will be refined. As efficacy is confirmed, certain CAM modalities will transition into mainstream medicine, whereas others will not. It is our responsibility as “complete physicians” to appreciate the art and science of our field for the benefit of our patients and incorporate the best modalities appropriate for the specific patient before us.

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