Asthma: A Review of Complementary and Alternative Therapies

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Introduction
Although effective medications for managing asthma exist within conventional Western medicine (eg, inhaled corticosteroids and bronchodilators), some parents turn to complementary and alternative medical (CAM) therapies to treat their children’s asthma. (1) Some reasons cited for using CAM therapies include concern about the long-term effects of steroid use; frustration that asthma does not resolve with conventional therapies; dissatisfaction with physician-patient interactions; belief that CAM is natural and, therefore, safe; and desire to have autonomy in making health choices. (1)(2) This review of published scientific literature assesses the efficacy and safety of some common CAM therapies in preventing and treating pediatric asthma.

Natural Health Products
Natural health products (NHPs), including vitamins, minerals, herbal remedies, and other dietary supplements such as fish oil and probiotics, are used widely to prevent and treat asthma. (3) Like conventional therapies, NHPs used to treat asthma can be categorized as having anti-inflammatory, bronchodilator, and other effects. Few of these NHPs have been evaluated in pediatric trials.

Vitamin C
Vitamin C is an important antioxidant found in abundance in the extracellular fluid lining of the lung. Low intake of vitamin C is associated with pulmonary dysfunction. (4) Several observational studies in children have reported a beneficial relationship between a high fruit intake and improved lung function. (5)(6) However, a 2004 Cochrane systematic review of eight randomized, controlled trials (RCTs) concluded that evidence was insufficient to recommend a specific role for vitamin C in treating asthma. (4) Of the eight included studies, three small studies (fewer than 41 participants each) concluded that vitamin C supplementation was beneficial; five studies, including the largest trial (n=210), showed little or no beneficial effect. Larger, long-term RCTs are needed to clarify the possible role of vitamin C in the treatment of asthma. Most researchers have used daily doses of 500 to 1,000 mg. Evidence from clinical trials show vitamin C supplements at doses less than 2,000 mg/d to be safe, although there have been reports of occasional gastrointestinal (GI) upset or mild diarrhea. (7)

Ivy Leaf
Ivy leaf, the dried leaf of Hedera helix L., is believed to have bronchodilating, spasmylytic, and antibacterial effects. Ivy leaf has been used for the treatment of upper respiratory tract infections and coughs. (8) A review of three small German-language trials, including crossover, double-blind trials, examining the efficacy of ivy leaf cough drops, suppositories, or syrup in children who had asthma found ivy leaf in all forms to improve respiratory function. (8) Only one adverse event (AE) of ivy treatment, exacerbation of existing atopic dermatitis, was reported in any of these trials. Although this preliminary evidence suggests that ivy leaf may improve airway resistance in children who have asthma, larger RCTs and...
additional safety data, particularly in North America, where different products may be marketed from those used in the positive German trials, are needed before ivy supplements can be recommended.

**Butterbur**
Historically used for treating asthma and reducing GI spasms, the butterbur root (*Petasites hybridus*) contains petasins that are believed to have an anti-inflammatory effect. (9) One open-label trial examined the efficacy and safety of a standardized extract of butterbur root given over 2 to 4 months to 64 adults and 16 children who had mild-to-moderate asthma. (9) Adults took 150 mg/d, and children took 50 to 150 mg/d, depending on age. Treatment was associated with improved airflow; reductions in the number, duration, and severity of asthma attacks; and decreased reliance on asthma medications. Eleven AEs were reported by seven patients: sneezing, coughing, dyspnea, conjunctivitis, rhinitis, abdominal pain/flatulence, hair loss, depression, and halitosis. Based on physician rating of causality, these AEs were determined to be unrelated to the study intervention. (9) Because the study lacked a control group, additional research using a larger, more diverse group of children is needed to evaluate the benefits of butterbur before it can be recommended.

**Tylophora Indica**
The *Tylophora indica* (*T indica*) plant, indigenous to India, traditionally has been used to treat asthma due to its purported anti-inflammatory and antiallergic effects. A review that included five RCTs published between 1968 and 1979 found the efficacy of *T indica* in the treatment of bronchial asthmatic symptoms to be inconclusive. (10) One study identified the trial population as comprised of both adults and children; the rest of the studies did not report this information. In four of the five studies, the use of *T indica* improved asthma symptoms. In one study, no benefit was observed. AEs of *T indica* reported in these studies included nausea, vomiting, mouth soreness, and alterations in taste sensation. (11) More studies on the efficacy and safety of *T indica* are needed before recommendations for its use in children can be made.

**Dietary Fatty Acid**
Omega-3 fatty acids, essential to human health, are precursors to anti-inflammatory cytokines that reduce airway inflammation. Epidemiologic studies suggest a beneficial association between dietary intake of omega-3 fatty acids and asthma. However, a 2006 systematic review of 10 RCTs, including two in children, found no consistent effect of omega-3 fatty acid supplementation on lung function, asthma symptoms, or medication use in patients who had asthma. (12) In the studies reviewed, nausea and abdominal discomfort were common AEs and seemed to be dose-related. An Australian RCT, which followed 616 children who were receiving omega-3 fatty acid for a period of 5 years, found no benefits for asthma. (13)

Some AEs of fish oil supplementation are common, including fishy taste and belching, although serious AEs are rare. Consumption of fish itself may involve risk due to excessive mercury content, but fish oil supplements that have been tested by consumer laboratories are largely free of mercury, polychlorinated biphenyls, and other pollutants. Due to the safety of supplements, their use as a complementary therapy can be tolerated for pediatric patients who have asthma. However, given the mixed results of earlier studies and the increased consumption of these supplements by the pediatric population, large RCTs in children are warranted.

**Probiotics**
Probiotics are nonpathogenic microbes used to improve or normalize the balance of gut microflora. An Austrian study in which 59 children ages 6 to 12 years who had intermittent or mildly persistent asthma received either laser acupuncture and probiotics or usual care reported improvements in peak flow, (14) but it is difficult to distinguish the effects of acupuncture from probiotics. An RCT published in 2007 reported no effect of long-term consumption of fermented milk containing *Lactobacillus casei* on asthma symptoms in 187 preschool-age children who had allergic asthma. (15) Although probiotic use by healthy individuals is considered safe, use by seriously ill or immunocompromised children has been associated with aggravation of existing symptoms, pneumonia, septicemia, and meningitis. The safest sources of probiotic bacteria in the diet are fermented foods, such as buttermilk, yogurt, kefir (a cultured milk product), and sauerkraut. Larger trials comparing the use of various types of probiotics in children who have different types of asthma are needed before probiotics can be recommended as adjunctive therapy.

**Homeopathy**
Homeopathic remedies are small, highly diluted quantities of substances that cause the symptoms one is trying to treat if given at higher or more concentrated doses.
A systematic review of six double-blind, placebo-controlled trials (n=556), two of which were conducted in children and four in adults, concluded that the benefits of homeopathy on asthma symptoms remains unproved, given the differences in treatments and methodologies. (16) In one of the pediatric studies included in the review, AEs included exacerbations of eczema, headaches, and fever. (17) Homeopathic practitioners recognize a phenomenon known as “aggravation,” which occurs in about 10% to 20% of patients and involves worsening of symptoms for several hours after taking homeopathic medicine. (18)

**Traditional Chinese Medicine (TCM)**

TCM is an ancient Chinese system of medicine that includes medication, herbal and nutritional therapy, restorative physical exercises, massage, and acupuncture.

TCM herbal remedies typically include mixtures of several herbs that have different physiologic effects. Huntley and Ernst (10) conducted a systematic review of 17 RCTs investigating the effectiveness of herbal medicines to treat asthma, six of which evaluated the effects of TCM. All of the TCM trials were of poor methodologic quality, as assessed by the Jadad scale, which evaluates the quality of clinical trials (ie, lack of blinding or sufficient information about randomization, dropouts, or AEs).

There are reports in the literature of AEs associated with TCM preparations from China that have been contaminated with toxins (ie, heavy metals such as arsenic or mercury) or adulterated with prescription medications such as glucocorticosteroids. (19) A study of 260 TCM patent medicines collected from retail stores in California found that at least 83 (32%) contained undeclared pharmaceuticals or heavy metals, and 23 (9%) had more than one adulterant. (20) Given the poor quality of data on effectiveness and the substantial concerns about product variability and adulteration, TCM herbs are not recommended in the treatment of pediatric asthma.

**Acupuncture**

Most trials assessing the efficacy of acupuncture have involved adult patients, although a few have focused specifically on children. Evidence from case studies suggests that acupuncture is an effective adjunct to conventional care for asthma, (21) but results from RCTs and systematic reviews have been mixed, partially due to poor methodologic quality. (22) (23) Beneficial effects of acupuncture have been found more often in low-quality studies (ie, small sample size, no randomization, and inadequate analysis). (22)

The use of acupuncture rarely has resulted in serious AEs such as pneumothorax, injury to the central nervous system, and skin infections. (24) A summary of 12 prospective studies involving more than 1 million treatments showed that the risk of a serious AE from acupuncture is approximately 0.05 per 10,000 treatments and 0.55 per 10,000 individual patients. This risk is lower than that of many prescription pharmaceuticals. (24) Rigorous trials involving pediatric patients are needed to establish the extent of acupuncture’s effectiveness as an adjunctive therapy for asthma, although its relative safety means that it can be tolerated if parents choose to use it as an adjunctive therapy.

**Massage Therapy**

There is a paucity of RCTs assessing the efficacy and safety of massage in pediatric patients who have asthma. A 30-day RCT evaluated the effectiveness of 20-minute massage therapy sessions, given by parents at bedtime, in reducing asthma symptoms in 32 asthmatic children (ages 4 to 14 y). (25) In the control group, parents delivered relaxation therapy. Massage therapy, as compared with relaxation treatment, improved children’s pulmonary function. No AEs were observed in this study. Although few AEs due to massage therapy are documented, there has been one report of two adult cases of carotid dissections from a shiatsu-type neck massage. (18)

**Chiropractic**

Some believe that spinal manipulation can be used to relieve nonmusculoskeletal conditions, including asthma, by correcting subluxation and restoring normal mechanical and nerve function, which improves airway function.

Two RCTs, one Canadian (n=91) (26) and the other American (n=36), (27) have evaluated the effectiveness of chiropractic manipulation or sham therapy (simulated chiropractic manipulation, which involved light manual contact) for treating asthma in children ages 7 to 16 years and 6 to 17 years, respectively. Both studies found that chiropractic manipulation had no benefit compared with sham therapy. Although no AEs were observed, the safety of pediatric spinal manipulation is not yet known. Young children who have anatomic immaturity are more vulnerable to injury from rapid rotational movement or excessive force. Although rare, serious AEs, including paraplegia and death, have been reported. (28) More research is needed to elucidate the efficacy and safety of chiropractic care for asthma.
Osteopathy
The World Osteopathy Health Organization defines osteopathy as a “system of healthcare that relies on manual contact for diagnosis and treatment.” Osteopathy emphasizes the structural and functional integrity of the body as well as the body’s intrinsic tendency to self-heal. Research into the efficacy of pediatric osteopathic manipulative treatment (OMT) is limited. One single-blinded RCT, in which 140 children, ages 5 to 17 years, who had asthma received OMT (rib raising, muscle energy for ribs, or myofascial release) or sham (a conventional physician placed his/her hands on the same regions involved for the OMT group) found that OMT resulted in improved mean peak expiratory flow of 13 L/min compared with 0.3 L/min in the sham group (P=0.05). (29) No AEs were observed. This study was limited by the use of several osteopaths who possessed a variety of skill levels and range of techniques. Although results suggest that osteopathy may be a useful adjunctive treatment, determination of the efficacy and safety of OMT for pediatric asthma requires trials that have larger sample sizes, long-term follow-up, full measures of pulmonary function, and consistent application of OMT in experimental groups.

Mind–Body Techniques
Mind-body medicine focuses on the interactions between the brain and body and emphasizes the powerful ways that emotional, mental, social, spiritual, and behavioral factors can affect health. Although the following findings suggest positive effects, the small sample sizes mean that evidence should be viewed cautiously until support from larger studies becomes available.

Vazquez and Buceta (30) examined the effects of two psychological treatments in 41 children 8 to 13 years of age who had mild-to-moderate emotionally mediated asthma (defined as experiencing at least two occasions when asthma attacks were emotionally triggered). The first treatment was a self-management (SM) program wherein patients were trained in breathing exercises, received information on behavioral techniques to manage asthma better, and conducted imaginary rehearsals on how to manage an asthma attack. The second treatment included an SM program supplemented with training in relaxation techniques (SM-R). The control group followed standard pharmacologic treatment for asthma. The intervention included a weekly 1-hour session over a period of 6 weeks.

All intervention patients (ie, those who received SM and SM-R) had reduced subjective intensity and severity of asthma attacks compared with the control group. The duration of asthma attacks in the SM-R group was decreased significantly, and this group’s peak expiratory flow rate, compared with patients in the SM program or the control group, also was much improved.

Hypnosis
The use of hypnosis in treating asthma, especially an acute attack, is controversial, given that hypnosis has been associated with anxiety and panic, factors that may exacerbate asthmatic attacks. Hackman and colleagues (31) conducted a literature review on the use of hypnosis in the treatment of asthma and identified five articles on pediatric hypnosis. Three studies assessing the efficacy of relaxation-mental imagery, a form of autohypnosis, found no significant changes on pulmonary function tests but reported reduced asthma severity, measured through diary entries, as well as by school absences and visits to emergency departments or physicians. The remaining two studies examined the use of hypnosis during acute asthma attacks in children. One study found that forced vital capacity and peak volume improved by 50% and 32%, respectively, 30 minutes after hypnotic induction. The second study found that 80% of patients treated with hypnosis did not require asthma medication. These conclusions were based on patients’ airway resistance measured during the asthma attack, after hypnosis, and after 15 symptom-free days.

A United States study assessed the daily use of hypnotherapy over a 30-month period in 303 children who had a range of pulmonary symptoms, including asthma (n=21). (32) Of the 21 children who had asthma, 8 reported improvements in frequency and intensity of their asthma, 7 reported no improvements, and 6 were lost to follow-up. No AEs were observed.

Biofeedback
Biofeedback involves the use of a monitor that amplifies and feeds back information on physiologic responses so patients can learn to regulate their responses. It is a form of psychophyslogic self-regulation. (33) A Russian case series of 20 children ages 9 to 16 years explored the efficacy of 13- to 15- to 30-minute sessions of the Smet-ankin Method of biofeedback, which includes pursed-lip breathing, abdominal breathing, and relaxation, for increasing the amplitude of respiratory sinus arrhythmia. (34) Although children had improvements in pulmonary function, the improvements were small and not considered clinically relevant. The authors noted their study’s inability to assess the method’s effectiveness due to vari-

ous methodologic weaknesses, including a small sample size and lack of control group.

**Conclusion**

Several studies suggest that certain CAM therapies might improve the quality of life of children who have asthma. Promising data have emerged regarding the following treatments: ivy leaf extract, butterbur, *T. indica*, massage, osteopathy, hypnosis, and in patients having emotionally mediated asthma. Conversely, available studies indicate that acupuncture, homeopathy, probiotics, and chiropractic therapy do not lead to objective improvements in childhood asthma. Neither dietary modification (involving fatty acid intake and vitamin C) nor the Smetankin protocol combined with respiratory sinus arrhythmia biofeedback showed conclusive results. Studies of TCM herbs are of poor quality, and contamination with toxins and drugs is a concern. As more rigorous studies evaluate CAM for efficacy, safety, and cost effectiveness in childhood asthma, pediatric clinicians and parents will be better equipped to make informed decisions regarding treatments.

**References**


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