



Complementary and alternative medicine for pediatric otitis media

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ABSTRACT

Objective: To review the literature involving complementary and alternative medicine (CAM) for pediatric otitis media. Multiple modalities are discussed, including prevention involving breastfeeding, nutrition, and vaccination; symptomatic treatment involving homeopathy, natural health products, and probiotics; manual manipulations involving osteopathy and chiropractics; and traditional Chinese and Japanese medicine. The information presented will assist physicians in advising patients on their decision-making during the early stages of otitis media when antibiotics and surgery are not yet indicated.

Methods: A systematic literature search was conducted through January 2012 in PubMed using MESH term "otitis media" in conjunction with "complementary therapies," "homeopathy," "manipulation, osteopathic," "manipulation, chiropractic," "acupuncture therapy," "probiotics," "naturopathy," and "xylitol." These searches yielded 163 unique results. Abstracts and titles were evaluated for relevance. Case reports, case series, randomized controlled trials, and basic science research were included. Publications not relevant to the discussion of alternative medicine in otitis media were excluded. Bibliographies were checked for further publications. Thirty-six unique publications were reviewed.

Results: Of all therapies in complementary and alternative medicine, only xylitol has been studied in well-designed, randomized, blinded trials; it is likely effective, but compliance limits its applicability.

Conclusions: Management of acute otitis media begins with watchful waiting. Herbal eardrops may help relieve symptoms. Homeopathic treatments may help decrease pain and lead to faster resolution. Prevention should be emphasized with elimination of risk factors, such as second hand smoke and bottle-feeding, as well as maintaining nutrition and vaccinations. Vitamin supplementation may be helpful. Probiotics and xylitol may be beneficial as well. Traditional Chinese/Japanese therapies show promising results but remain speculative until further research is conducted. Severe cases of otitis media with complications or those that fail to improve with observation or CAM (after 48–72 h) should be treated with antibiotics and, in some cases, surgical intervention. It is best to consult a physician when making treatment decisions for full guidance on the risks and benefits of any treatment option.

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1. Introduction

Otitis media is one of the most common diseases of childhood. It has a peak incidence between ages 6 and 15 months. Almost half of all pediatric antibiotic prescriptions are written for otitis media, which also prompts more physician visits than any other childhood illness. More than \$100 is spent per episode, and the cost of treatment in the US is approximately \$2–3.5 billion per year [1].

The American Academy of Pediatrics (AAP) and the American Academy of Otolaryngology and Head and Neck Surgery (AAOHN) define acute otitis media (AOM) as (1) history of acute onset of signs and symptoms, (2) presence of middle-ear effusion, and (3) signs and symptoms of middle-ear inflammation. In 2004, due to concern over antibiotic resistance and the high spontaneous resolution rate (80% within three days), the American Academy of Family Physicians (AAFP) and AAP recommended initial watchful waiting in children with acute otitis media. During this time, families often seek alternative treatments. Unfortunately these interventions are difficult to evaluate secondary to the rapid resolution and natural history of AOM. In this manuscript we discuss current concepts and present a literature review of complementary and alternative medicine (CAM) for otitis media. This literature review was institutional review board exempt.

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2. Prevention

One of the first tenets of many complementary and alternative modalities is prevention. Increased rates of otitis media with bottle-feeding compared to breastfeeding have been shown. In 2009, Sabirov et al. evaluated children with AOM, noting the prevalence of nontypeable *Haemophilus influenzae* was higher and the presence of specific immunoglobulin G antibodies was lower in bottle-fed infants compared with breast-fed infants [2]. Additionally, smoking around children, large daycare settings, and pacifier use can also play a causative role in AOM [3] (Table 1; Appendix A).

Recently, nutrition and food allergies have been implicated in the pathogenesis of otitis media. In a recent study evaluating nutritional deficiencies, patients with acute suppurative otitis media and chronic otitis media (COM) as well as recurrent AOM were found to have retinol/vitamin A levels lower than in age-matched controls [4]. Zinc deficiencies also have been implicated in AOM. In a meta-analysis in 2009, Elemraid et al. reviewed rates of AOM/COM and vitamin supplementation, finding evidence that deficiencies of zinc or vitamin A, or both, may lead to increased rates of otitis media [5]; however, in 2010, Abba et al. reviewed 12 randomized controlled trials in which placebo was compared to zinc (given at least once a week for at least one month) and found conflicting reports regarding the efficacy of supplementation [6]. Deficiencies in EPA (an omega 3 fatty acid), vitamin A, and selenium also have been associated with recurrent AOM [7], with supplementation resulting in fewer antibiotic prescriptions.

Vaccines also play an important role in AOM prevention. In 2001, the Centers for Disease Control and Prevention recommended all young children should receive the pneumococcal 7-valent conjugate vaccine (PCV7). This led to a decrease in rates of otitis media caused by pneumococcus and decreased tympanostomy tube placement for recurrent disease [8]. Immunization of all healthy infants could prevent over one million episodes of AOM each year. The newer pneumococcal 13-valent conjugate vaccine (PCV13) vaccine was introduced to address the residual burden of pneumococcal diseases that has persisted since the introduction of PCV7. Prevention of preceding viral illnesses, such as influenza, may also decrease the incidence of AOM [9].

3. Symptomatic relief

With watchful waiting recommendations, symptomatic relief of AOM is paramount. Warm compresses, steam, gargling salt water, and decongestant nasal sprays may benefit some patients. Others find herbal eardrops helpful, but their efficacy is unclear secondary to variable composition (usually a combination of marigold [*Calendula flores*], garlic [*Allium sativum*], mullein [*Verbascum thapsus*], St. John's wort [*Hypericum perforatum*], lavender, and vitamin E). Comparable rates of analgesia in patients with AOM can be achieved with naturopathic herbal extracts compared to anesthetic ear drops. In 2001, Sarrell et al. compared Otikon Otic

Solution (Healthy-ON, Petach-Tikva, Isreal), a naturopathic herbal extract, with anesthetic ear drops containing ametocaine and phenazone in glycerin and found comparable rates of analgesia for AOM [10]. Similarly, significantly faster resolution of symptoms with administration of homeopathic eardrops compared to “standard therapy” has been shown [11]. One Cochrane systematic review labeled naturopathic ear drops “modestly therapeutic” [12]; however, a subsequent Cochrane review found insufficient evidence to determine their effectiveness [13].

4. Complementary and alternative medicine in general

Evaluating the efficacy of CAM for otitis media is difficult due to lack of randomization, unclear time to effect, and disagreement on the definition of CAM itself. Because CAM medications are not regulated by the FDA and patents are not available, there is little economic incentive for research. Despite this, 46% of children aged 1–7 years with three or more episodes of AOM in six months had used some component of CAM, and many fewer of these children (15–34%) were PCV7 or influenza vaccinated [14]. Most CAM studies have significant methodological flaws and no cost analyses, making definitive conclusions difficult.

5. Homeopathy

Homeopathy is based on the *like cures like* principle: a substance that produces symptoms in a healthy patient can relieve those symptoms in an ill patient. It includes belladonna, chamomilla, and *Hepar sulphuricum* (Appendix B). They are generally regarded as “safe,” but there are reports of an initial worsening of symptoms in approximately 10–20% with AOM [15]. Three severe adverse events were reported in the practice of one homeopathic provider (perforation of a tympanic membrane, cholesteatoma, and mastoiditis), though it is unclear if these are directly attributable to the homeopathic interventions [16].

In a small, non-blinded, randomized controlled trial by Harrison et al. in 1999, 33 children (aged 18 months to 8 years) with otitis media with effusion, abnormal tympanograms, and hearing loss (greater than 20 db) were randomized to either homeopathic therapy or watchful waiting. More patients in the homeopathic group had normal tympanograms compared to the watchful waiting group (75% vs. 31%, $P=0.015$). There was also a trend toward improvement in hearing, lower antibiotic use, and lower referral rates to specialists in the homeopathic group, but this was not significant [17].

Compared to conventional treatment, homeopathy may yield faster symptom improvement with less analgesic and antibiotic use [18,19] and may be 14% less expensive [16]. Larger randomized, controlled studies are required to assess the efficacy and safety of these treatments.

6. Other natural health products

Natural health products such as echinacea, cod liver oil, and xylitol are generally regarded as safe, though efficacy is unclear and some patients experience significant gastrointestinal symptoms. While there are many natural health products available (see Appendix C for a more complete list), one of the most common herbs taken in the United States is echinacea, which is generally taken for or to prevent the common cold. Unfortunately, most echinacea products in the United States are derived from *Echinacea augustifolia*, an herb that has never been shown to improve symptoms related to upper respiratory infections. Only *Echinacea pallidum* root and *Echinacea purpurea* leaf have demonstrated efficacy in this regard. Looking at a mixture containing echinacea (as well as propolis and vitamin C), Cohen et al. [20] found the

Table 1
Risk factors for recurrent acute otitis media (AOM).

Risk factor	Risk for	Relative rate	P value
Family history of AOM	AOM	2.6	<0.001
Daycare outside home	AOM	2.5	0.003
Not breastfeeding at all	Recurrent AOM	2.1	<0.001
At least one sibling	Recurrent AOM	1.9	0.001
Child care outside home	Recurrent AOM	1.8	0.004
Parental smoking	AOM	1.7	<0.001
Family daycare	AOM	1.6	0.002
Pacifier use	AOM	1.2	0.008
Breast feeding <3 months	AOM	1.2	0.003

Adapted from Uhari et al. [3].

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