Complementary, Holistic, and Integrative Medicine: Fever

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Introduction
Fever, commonly defined as a temperature of 99.5°F (37.5°C) or greater (axillary) or 100.4°F (38.0°C) or greater (core), is a common pediatric sign that has many causes (eg, bacterial or viral infection). Some of the causes are self-limiting and do not require treatment; others are serious underlying conditions requiring treatment. In children (particularly infants), seeking medical attention for the evaluation, diagnosis, and treatment of the underlying cause of fever is standard care. (1) Some families seek to alleviate fever and its associated symptoms (eg, discomfort, irritability, crying) through easily accessible, adjunctive self-care techniques and complementary and alternative medicine (CAM) therapies.

This review discusses common CAM therapies that have been used to treat fever in children and is limited to the following modalities, for which published scientific literature is available: physical methods, natural health products (NHPs), and traditional Chinese medicine (TCM).

Physical Methods
Physical methods such as tepid sponging, bathing, fanning, and cooling blankets often are used to treat fever. (2)(3) Although physical methods often are inexpensive and readily available, the efficacy of many of these methods has not been established through rigorous research. (4)

A 2006 systematic review of seven quasi-randomized, controlled trials (RCTs) that included children (n=467) ages 1 month to 15 years who had fever of a “presumed infectious origin” compared physical methods (eg, tepid sponging) with or without a drug treatment (antipyretic) to a drug treatment, placebo, or no treatment. (4) Of the seven studies, three small trials had positive findings and demonstrated that tepid sponging helped to reduce fever in children. However, these findings were observed in children who had already taken acetaminophen, so it is unclear whether the tepid sponging was responsible for the observed reduction in fever. The trials considered in this systematic review had very small numbers and suffered from various methodologic limitations, such as inadequate/unclear methods of subject allocation and high dropout rates or withdrawals. The authors concluded that evidence to either support or discourage the use of physical methods alone to treat fever is limited. (4)

Another systematic of 10 quasi-RCTs, including the seven studies in the previously cited review, also found minimal benefit from sponging in temperate climates and concluded that evidence to support the routine use of sponging is lacking. (5) This review involved studies of febrile children between 3 months and 16 years of age who were not critically ill.

In 2000, a review examining the efficacy of tepid sponging for fever cited results from four pediatric studies and reported little advantage to using tepid sponging in addition to acetaminophen compared with using acetaminophen alone. Furthermore, acetaminophen appeared to be a better tolerated treatment and was preferred by parents. (6)

Common adverse events (AEs) of physical methods of treating fever in general, and

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NOTE: The agents discussed in this series are designated as dietary supplements rather than drugs. Although dietary supplements are regulated by the United States Food and Drug Administration (FDA), their manufacturers may make claims with little evidence and need not prove safety prior to marketing. The burden is on the FDA to monitor safety after the product is on the market. Readers are referred to the 1994 Dietary Supplement Health and Education Act (www.cfsan.fda.gov/~dms/dietsupp.html).
sponging in particular, include shivering, having “goose pimples,” crying, and having discomfort. These AEs are the same fever-associated symptoms that sponging aims to reduce. Thus, the efficacy of sponging in children is arguable. Rare AEs reported after sponging with alcohol include the loss of consciousness. (4)

Natural Health Products

Traditional Herbal Medicine

Many popular NHPs used to treat fever (eg, gentian, licorice root, peppermint, yarrow) have not been evaluated scientifically through clinical studies. One published RCT assessed the efficacy of a Japanese herbal medicine, Mao-to, to treat fever and influenzalike symptoms in 60 children (ages 5 months to 13 years). (7) Mao-to is a combination of Ephedra Herba, Cinnamomi Cortex, Armeniaca Semen, and Glycyrrhizae Radix and is reported to have antiviral and autoimmune effects. Children in the study were randomized to take either Mao-to alone orally (0.06 g/kg per dose three times daily); a neuraminidase inhibitor, oseltamivir (2 mg/kg per dose twice daily) alone; or a combination of Mao-to and oseltamivir. (7) The group that received only Mao-to had a shorter duration of fever after starting the medication (15 hours, 95% confidence interval [CI] 13.2 to 22.1, \( P<0.01 \)) compared with the combination of Mao-to and oseltamivir group (18 hours, 95% CI: 15.2 to 27.7, \( P<0.05 \)), and the neuraminidase inhibitor-only group (24 hours, 95% CI: 23.5 to 43.0, \( P<0.01 \)). No AEs were reported. These results suggest that Mao-to may be a cost-effective control for fever due to type A influenza in children because it costs between one tenth and one twentieth that of neuraminidase inhibitors. (7)

Limitations of this study include lack of true randomization because patients younger than 1 year of age were assigned to the Mao-to-only group (they did not meet the criteria for neuraminidase inhibitor treatment in Japan) and small sample size. (7) Study results suggest that Mao-to could be a possible candidate for additional research outside of Japan to assess the generalizability of efficacy and safety of the herb.

Zinc or Vitamin A Supplementation

Both zinc and vitamin A are important for human growth and immune function. (8) An RCT examined the effects of zinc acetate and vitamin A supplementation on resolving fever in 153 children (ages 2 to 24 months) hospitalized in India who had severe acute lower respiratory infection (ALRI), including fever. Children received zinc acetate (10 mg twice daily for 5 days) plus vitamin A placebo; vitamin A (10,000 mcg retinol twice daily for 4 days) plus zinc placebo; zinc acetate plus vitamin A; or zinc and vitamin A placebos. For boys supplemented with zinc acetate only, the resolution of fever was 3.1 times more rapid \((P=0.003)\) than seen in children not supplemented with zinc. Reported AEs included death \((n=1)\), diarrhea \((n=5)\), pyopneumothorax \((n=4)\), and bulging fontanelle \((n=3)\). These results suggest that zinc treatment reduces duration of fever due to ALRI for boys, but not for girls, and that vitamin A treatment had no benefit. (8)

Baseline evaluations of zinc or vitamin A status were not reported in this study for the “urban and peri-urban poor” subjects, who may possess deficiencies (ie, suffer from malnutrition) that may make them much more vulnerable to the onset of ALRI and its complications and also might affect the resolution of fever, thereby serving as confounders. Conclusions based on the results, therefore, are not generalizable to other pediatric populations, and research to determine the exact mechanism of action for zinc therapy is needed. Zinc has several AEs. When taken in high doses over long periods, it can decrease immunity and copper absorption, causing copper deficiency that, in turn, increases the risk of anemia. Milder AEs associated with excessive zinc intake include headaches, stomach irritation, nausea, and vomiting.

Traditional Chinese Medicine

TCM is an ancient Chinese system of medicine that includes meditation, herbal and nutritional therapy, physical exercises, massage, and acupuncture. A paucity of well-designed RCTs exist that have investigated the effectiveness of TCM remedies to treat fever. Thus, the information presented in this section comes from case reports that have several methodologic limitations. Such findings should be viewed as being preliminary, inconclusive, and requiring additional research.
Cupping
In TCM, cupping involves the application of a vacuum to a localized area of the skin. (9) This procedure is believed to increase circulation in the treated area and theoretically eliminate toxins trapped in the tissue. (10)
Liu assessed the efficacy of cupping therapy in 103 individuals from 17 to 58 years of age who had high fever due to upper respiratory tract infection. (11) The intervention was described as “fire-insertion cupping” for 5 to 15 minutes over three pressure points on the head. The author defined the outcomes as: 1) cured, if the body temperature dropped to the normal range and was still normal after 14 hours or 2) effective, if the body temperature dropped to the “normal range” (not defined) and was no more than 100.4°F (38°C) 14 hours later or if the temperature dropped to between 99.3° and 100.4°F (37.4° and 38°C) and rose by no more than 0.4°C 14 hours later. (11) A total of 31 study participants were described as cured, and results in 68 cases were termed effective; the outcomes from the remaining four cases and any AEs were not mentioned.
Although the authors reported a high success rate (96%) with this method, this study suffers from major methodologic inadequacies, including lack of information on the method of diagnosing upper respiratory tract infection, “blinding,” randomization, and a control group. Study results need verification through larger and better designed RCTs. Furthermore, because this research was conducted in a predominantly adult population, the findings may not be generalizable to children.
Several mild AEs from the use of cupping have been reported, including circular ecchymotic lesions (bruising). (10) Occasionally, cupping can cause panniculitis (inflammation of subcutaneous fatty and muscle tissue) or thermal injury. (10)

Acupuncture
Acupuncture is a method of healing developed in China at least 2,000 years ago that describes a family of procedures involving stimulation of anatomic points on the body by a variety of techniques. The acupuncture technique that has been scientifically studied most involves penetrating the skin with thin, solid, metallic needles that are manipulated by the hands or that carry electrical stimulation. (12)
A Chinese study investigated whether fever caused by the common cold could be treated with application of acupuncture needles at three pressure points on the head. (13) Participants (n=57) ages 16 to 68 years suffering from the common cold were recruited from a local hospital. Of these, 45 individuals had received medication more than 4 hours earlier, and 12 had received none. Patients were asked to rest quietly for 10 to 15 minutes before the acupuncture. The author reported statistically significant changes in 11 objective indicators after treatment (eg, body temperature, respirations, heart rate, blood pressure, temperature at the three pressure points on the head where acupuncture needles were applied). The frequency of these measures was not described, and no correlations between them were discussed.
Clinical effects were described as being effective in 46 of 57 cases for a total efficacy rate of 80.7%. (13) Finally, a comparison of morbidity scores before (8.55±0.43) and after (3.85±0.22) treatment showed a statistically significant difference. Although this study observed positive effects of acupuncture in treating fever and associated symptoms in patients suffering from the common cold, influenza, acute tonsillitis, and acute bronchitis, poor study design limits the validity of the findings. Methodologic limitations include lack of a control group, poor reporting of outcomes, and questionable primary outcome measures (due to combining objective and subjective measures into one score). No AEs were reported. Additional research in this area is needed to clarify the efficacy and safety of needle acupuncture to reduce fever.
Acupuncture therapy rarely results in serious AEs. (14) Evidence from 12 prospective studies of more than 1 million treatments estimates the risk of a serious AE occurring from acupuncture therapy to be 0.05 per 10,000 treatments and 0.55 per 10,000 individual patients in the general population. (14) The most common serious AEs included pneumothorax, injury to the central nervous system, transmission of hepatitis B, and skin infections. (14)

Conclusion
Reviews of available evidence have concluded that physical methods of cooling, such as tepid sponging, cannot be considered effective in reducing childhood fever due to the lack of clear and verifiable findings. The rationale for and physiologic mechanisms of the herbal medicine Mao-to and zinc supplementation for treating fever are not well understood; they should be viewed with caution when considered as treatments for children. Preliminary evidence for the efficacy of TCM (cupping and needle acupuncture) in treating fever comes from three inadequately described case series. These studies have methodologic shortcomings and do not provide sufficient evidence to support the use of these CAM therapies. The need for more rigorous studies to evaluate the efficacy of CAM therapies in children suffering from fever is clear.
References
