

Is buckwheat honey more efficacious than dextromethorphan at treating cough associated with upper respiratory tract infections in the pediatric population?

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Citation

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Abstract

INTRODUCTION

Cough is one of the most common and irritating symptoms experienced by pediatric patients with upper respiratory tract infections. This typically leads to loss of sleep for the child and their parents as well as discomfort, missed school and work. Over-the counter medications containing dextromethorphan are commonly purchased to help alleviate the cough. Apart from cost, these OTC medications may cause several unwanted side effects, not to mention, their efficacy is questionable (1). In contrast to dextromethorphan, honey is generally believed to be safe and has been used as a home remedy for many years. Recent information suggests that a certain type of dark honey, called buckwheat honey, may be the most effective treatment for cough(2).

Since cough associated with upper respiratory tract infections is so prevalent, especially in the pediatric population, it is important to ask (and answer) the following question, “Is buckwheat honey more efficacious than dextromethorphan at treating cough associated with upper respiratory tract infections in the pediatric population?” The answer to this question would be extremely helpful to clinicians who deal with pediatric patients on a frequent basis. If buckwheat honey does prove to be more efficacious, then it would save consumers money and it would also remove any of the negative side-effects that are attributed to over-the-counter medications containing dextromethorphan. The answer to this question would also be of great benefit for the sole reason that it would allow parents to provide a treatment that actually helps their child’s symptoms.

BACKGROUND

Cough is the reason for nearly 3% of all outpatient visits in the United States (more than any other symptom) and it most commonly occurs in conjunction with a URI (2). At night, it is particularly bothersome because it disrupts sleep.

The upper respiratory tract includes the sinuses, nasal passages, pharynx, and larynx which serve as gateways to the trachea, bronchi, and pulmonary alveolar spaces. URIs involve direct invasion of the mucosa lining the upper airway. Rhinitis, pharyngitis, sinusitis, epiglottitis, laryngitis, and tracheitis are specific manifestations of URIs. Viruses account for most URIs and person-to-person transmission of the viruses accounts for the way most URIs are spread. Patients with bacterial URIs may present in similar fashion, or they may present as a superinfection of a viral URI. Inoculation by bacteria or viruses begins when secretions are transferred by touching a hand exposed to pathogens to the nose or mouth or by directly inhaling respiratory droplets from an infected person who is coughing or sneezing (2).

Cough is an explosive expiratory maneuver that is reflexively or deliberately intended to clear the airways. Coughing is a normal response to the presence of mucus or other foreign material in the airway or upper airway (4). It is the 5th most common symptom prompting patients to visit their physician. Awareness of cough varies considerably. An acute cough is a cough that appears suddenly, interferes with sleep, or causes musculoskeletal chest wall pain which can be distressing, and lasts less than 3 weeks. An acute cough is most often caused by a URI, but it can be caused by heart failure, laryngitis, pertussis, and asthma(4). Persistent coughing is annoying and generally indicates irritation of the

pulmonary airways. Causes of chronic cough include medications such as ACE inhibitors, cystic fibrosis, COPD, GERD, and smoking.

The differential diagnosis for a pediatric cough that may be treated with dextromethorphan includes acute sinusitis, bronchitis, pharyngitis, croup, and allergic rhinitis. Acute sinusitis and pharyngitis typically present with coughs that are dry, while croup is described as ‘barking’.

Honey has many purported health benefits and has repeatedly been shown to aid in wound healing, even for children. For cough and cold symptoms, honey is cited by the World Health Organization as a potential treatment. Honey works as a demulcent that is cheap, popular, and safe. Demulcents may soothe the throat and can be recommended to provide some relief from cough in children. Honey also has anti-oxidant properties and increases cytokine release, which may explain its antimicrobial effects (2). Conversely, ingestion of honey accounts for about 20% of infantile botulism cases each year. Therefore, it is said that honey should be avoided in children younger than 12 months (6).

All of these factors must be considered when asking the question, “Is buckwheat honey more efficacious than dextromethorphan at treating cough associated with upper respiratory tract infections in the pediatric population?”

METHODS

This paper asks the question, “Is buckwheat honey more efficacious than dextromethorphan at treating cough associated with upper respiratory tract infections in the pediatric population?” This is a question about therapy. This type of question is best answered using a randomized double-blinded, placebo controlled trial (Level I/A). A computerized literature search for relevant studies was performed in EBSCO and Medline with full text databases. The following MeSH terms or text words in various combinations were used: “buckwheat honey”, “cough”, and “dextromethorphan.”

Non-English papers were excluded because translations were not available. The restriction to English language studies is unlikely to cause any bias, as a recent assessment reported that non-English papers are likely to be of low quality and could introduce bias into a review. The most up-to-date information was used so articles no older than 2004 were used in this paper. Only papers that involved humans and that were peer-reviewed were included.

DISCUSSION

STUDY 1

The first study chosen was “Child Assessment of Dextromethorphan, Diphenhydramine, and Placebo for Nocturnal Cough Due to Upper Respiratory Infection (5).” This study sought to investigate the efficacy of dextromethorphan (DM), diphenhydramine (DPH), and placebo (PL) for symptoms attributed to upper respiratory infections as determined by children, and to evaluate the correspondence of perception of nocturnal symptoms between children and parents. It was hypothesized that children would find more improvement in their nocturnal cough and sleep difficulty with DM and DPH than with PL. A strong correlation between responses of children and their parents was also expected.

Patients were recruited from two pediatric acute care clinics affiliated with the Pennsylvania State University College of Medicine in Hershey, Pennsylvania, from June 2002 to May 2003. Eligible children were 6 to 18 years of age and were a subset of patients with a clinical diagnosis of cough due to URI. After parental informed consent and child assent were obtained, parental and child assessment of the child’s nocturnal cough and sleep difficulty on the previous night were obtained through questions on a 7-point Likert Scale. Children could answer according to a visual scale of faces signifying degrees of symptom severity and a range of corresponding verbal responses. Responses ranged from “not at all” (0 points) to “extremely” (7 points). Children and their parents were asked about the child’s experience of (1) the frequency of coughing after bedtime the previous night, (2) sleep difficulty, (3) nighttime cough severity, and (4) the “bothersome” nature of the cough after bedtime. The parents and their children were questioned independently during their respective assessments to ensure that their responses did not influence one another.

Children were randomized in a double-masked fashion to receive DM, DPH, or placebo. DM was dosed by age according to label recommendations. DPH was dosed by weight as described by a standard pediatric reference. PL was administered in a dose volume of DM by age. A second survey asking the same questions was administered to assess nocturnal cough and sleep on the night after treatment was given. Again, parents and children were temporarily separated to ensure that their responses did not influence one another.

The children's scores for the four outcome measures in the different treatment groups were compared by using one-way analysis of variance. Thirty seven children with nocturnal cough due to URI and their parents were included in this ancillary analysis. Twelve children received DM, 12 children received DPH, and 13 children received PL. On follow-up, all parents reported that their children received the medications. The median age of children was 7.50 years and approximately 59% of patients were female, with no significant difference of demographic characteristics between treatment groups. In addition, no significant differences were found between baseline symptom severities and a combined symptom score in each treatment group. The scores for cough frequency, impact on sleep quality, cough severity, and "bothersome" nature of the cough were all significantly lower on the second night of the study for the entire cohort.

When comparing treatment groups, however, no significant differences were found for any of the outcomes. Children who received DM reported a 1.75-point improvement in cough frequency compared to improvements of 1.58 point and 1.38 in those who received DPH and PL, respectively. The children who received DPH reported 2.92 points improvement of sleep quality compared to 1.17 points of improvement by those taking DM and 1.15 point of improvement in those taking PL. Similarly, those who received DPH noted a 2.17-point improvement in cough severity, while the improvement reported by those who received PL and DM was 1.15 points and 0.75 points, respectively. Children found an improvement in the "bothersome" nature of the cough of 1.92 points when taking DPH compared improvements of 1.00 points for DM and 0.85 points for PL. When the reported scores for all outcomes were combined, no significant difference between treatments was detected. The children who received DPH reported the greatest improvement of 8.58 compared to an improvement of 4.67 points in those who received DM and 4.54 points of improvement in those who received PL. For each outcome, the parents' and children's scores were significantly correlated for cough frequency, change in sleep quality, cough severity, and 'bothersome' nature of the cough. However, none of these differences achieved statistical significance.

Overall, the entire cohort reported improved symptoms on the second night of the study, but neither treatment with DM or DPH was superior to PL for any of the study outcomes.

I found this study to be valid but with many variables. The sample size was relatively small which can yield falsely skewed results. Also, the results showed that everyone reported improved symptoms on day two, even though not one treatment proved to be better than the other. This leads me to question whether or not the treatments had anything to do with the symptom improvement, or if it was just the natural progression of the illness. The fact that dextromethorphan did not give statistically significant results for being a better treatment option than diphenhydramine or placebo, would help to support the original hypothesis that dextromethorphan may not be a suitable treatment option in the pediatric population. Another important factor to consider was that the basis of the results of this study were completely subjective, making it difficult to maintain the same standard of improvement throughout the cohort. It is especially difficult to assess this in the children who were at the younger end of the age spectrum. To improve this study, a larger sample size should have been used and perhaps some physical exam should be implemented to help assess the levels of improvement. Although this study does not directly compare DM with buckwheat honey, I still feel that it helps support the hypothesis that buckwheat honey is more efficacious at treating cough than DM. The fact that there was no statistical significance to prove that DM is better than placebo can be interpreted as saying that no treatment is comparable to DM. Buckwheat honey has been proven to improve cough when compared to PL; therefore, one could say that this helps support that buckwheat honey is more effective than DM at treating cough.

STUDY 2

The second study chosen was "Effect of Honey, Dextromethorphan, and No Treatment on Nocturnal Cough and Sleep Quality for Coughing Children and Their Parents (2)." This study compared the effects of a single nocturnal dose of buckwheat honey or honey-flavored dextromethorphan (DM) with no treatment on nocturnal cough and sleep difficulty associated with childhood upper respiratory tract infections. A no treatment arm was included instead of one with a placebo group for 2 reasons: (1) a previous study found no difference between DM and placebo for any outcome, and (2) a critique suggested that the study cohort was already improving at the time when DM or placebo was given, which limited the study's ability to detect a treatment effect.

From September 2005 through March 2006, patients were recruited from a single university affiliated pediatric practice in Hershey, Pennsylvania, on presentation for an acute care visit. Eligible patients were aged 2 through 18 years with cough attributed to URIs. The URIs were characterized by the presence of rhinorrhea and cough for 7 or fewer days' duration. Other symptoms may have included but were not limited to congestion, fever, sore throat, myalgias, and headache. Patients were excluded if they had signs or symptoms of a more treatable disease. They were also ineligible when they had a history of reactive airway disease, asthma, or chronic lung disease. Subjects were also excluded if on the prior evening they had taken a medication that included an antihistamine or DM hydrobromide within 6 hours of bedtime or DM polistirex within 12 hours of bedtime on the evening prior to or on the day of enrollment. Subjective parental assessments of their child's cough and sleep difficulty on the previous night were assessed after informed consent was obtained through previously validated questions using a 7-point Likert scale.

After stratification for age, each child was randomly assigned in a partially double-blinded fashion to receive artificially honey-flavored DM, buckwheat honey, or nothing in a 10-mL syringe. A compounding pharmacy prepared the DM to approximate the consistency, texture, flavor, smell and sweetness of honey. The syringes used for all of the 3 treatment groups were opaque and were placed brown paper bags to avoid investigator unblinding. Dosage for DM approximated typical OTC label recommendations. For the honey group, the volume of honey dispensed was equivalent to the age-driven volume dispensed for DM.

One hundred thirty children with URIs were enrolled and 105 completed the single-night study. The median age of the patients completing the study was 5.22 years, with no significant difference between treatment groups. Thirty five patients received honey, 33 received DM, and 37 received no treatment. Fifty-three percent of the children were female. There were also no significant difference between measures of symptom severity at baseline.

Symptom scores were obtained to describe the night before enrollment when no participants received treatment, and they were compared with scores from the subsequent night when honey, honey flavored DM, or no treatment was given before bed. When separated by treatment group, significant differences were detected in the amount of improvement reported for all of the study outcomes in the planned 3-way

comparison. All of the outcomes found honey to yield the greatest improvement, followed by DM, while no treatment consistently showed the least amount of improvement. For cough frequency, those who received honey had a mean 1.89 point improvement as rated by their parents compared with a 1.39 point change for those receiving DM and a 0.92 point change for those who had no treatment on the second night. Parents also noted similar improvements in the severity of their child's cough. While parents felt the cough was also less bothersome on the second night, again honey provided the greatest relief. The same trend was seen when assessing the improvement in the child's sleep. As might be expected, parental sleep improved in a fashion similar to that of their children, with the honey treatment arm improving the most by a mean of 2.31 points, followed by 1.97 points for DM and 1.51 points for no treatment. When the results for these outcomes were combined by adding the scores from the individual categories, honey again proved to be the most effective treatment. The children in this group improved by an average of 10.71 points compared with 8.39 points for DM treated children and 6.41 points for those who were not treated.

The results of this study demonstrate that in the overall comparison of the 3 treatment groups, honey was the most effective treatment for all of the outcomes related to cough, child sleep, and parent sleep. Furthermore, honey not DM, was superior to no treatment for nocturnal symptoms associated with childhood URI.

I found this study to be very valid. The method in which the study was carried out left little room for flaws. The patient sample size was fairly large and the treatments were given in a way to help ensure that the study remained double blinded. Each patient remained accounted for throughout the entire study. The researchers also had the advantage of learning from previous studies that aimed to prove the same hypothesis. The researches were able to see any mistakes that may have been made, as well as, find other ways to improve on this study to make sure the results were as reliable as possible.

CONCLUSION

Nocturnal cough and difficulty sleeping are common complaints by children with upper respiratory infections, and these illnesses are among the most common reasons for acute care pediatric visits. The AAP, however, has questioned the use of OTC medicines in children with acute cough, largely due to the lack of evidence of benefit but also

because of the potential for adverse effects associated with them (5).

Honey has well established antioxidant and antimicrobial effects, which have been suggested as the mechanism for its efficacy in wound healing and may help to explain its superiority in this study. Buckwheat honey is a dark variety of honey, and darker honeys tend to have a higher content of phenolic compounds. These compounds have been associated with the antioxidant properties of honey that may have contribute to its effects. Further, its topical demulcent effect may contribute to its benefits for cough as postulated by the World Health Organization review (6).

The results of both of these studies provide helpful information to support the hypothesis that buckwheat honey is more efficacious in treating cough associated with upper respiratory tract infections in the pediatric population. This is beneficial on many levels, including the fact that it is a more cost effective treatment, it avoids many potentially

harmful side effects, and provides optimal treatment.

References

1. Barkin S, Carroll KN, Cooper WO, et al. The Effect of Honey on Nocturnal Cough and Sleep Quality for Children and Their Parents. *Archives of Pediatrics & Adolescent Medicine*. 2007;161(12):1149-1153.
2. Beiler J, Berlin CM, Duda L, et al. Effect of Honey, Dextromethorphan, and No Treatment on Nocturnal Cough and Sleep Quality for Coughing Children and Their Parents. *Archives of Pediatrics & Adolescent Medicine*. 2007;161(12):1140-1146.
3. Meneghetti A. Upper Respiratory Tract Infection. eMedicine Web Site. Available at: <http://emedicine.medscape.com/article/302460-overview>. Accessed March 3, 2009.
4. Swan R. Cough. The Merck Manuals Online Medical Library Web Site. Available at: <http://www.merck.com/mmpe/sec05/ch045/ch045c.html>. Accessed March 3, 2009.
5. Paul I, Shaffer ML, Tournous SJ, et al. Child Assessment of Dextromethorphan, Diphenhydramine, and Placebo for Nocturnal Cough Due to Upper Respiratory Infection. *Clinical Pediatrics*. 2006;45:633-640.
6. Moon, KT. Honey, Dextromethorphan, and No Treatment in Children with Cough. *Journal of American Family Physicians*. 2008;78:388-390.

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