

Vicks VapoRub Safety and Children

—Proceed to the end of this document for Poison Prevention Week information—

Introduction

Vicks VapoRub ointment/cream and *Vicks VapoSteam* are widely used for symptomatic relief of cough and congestion. These and other camphor- and menthol-containing products have been available for many years. Because they are designed for topical use and are available without a prescription, many feel that they are safe in all circumstances. With the removal of oral infant cough and cold products from the OTC market due to safety concerns, topical camphor- and menthol-containing products are likely being used even more, especially in children less than two years of age. However, the safety of these products has recently been questioned.¹⁻³ This document discusses the risks of camphor- and menthol-containing products in the pediatric population.

Is Vicks VapoRub Effective?

Vicks VapoRub contains a combination of menthol, camphor, and eucalyptus oil. (*Vicks VapoRub* ointment regular scent [camphor 4.8%, eucalyptus oil 1.2%, menthol 2.6%], *Vicks VapoRub* ointment lemon scent [camphor 4.7%, eucalyptus oil 1.2%, menthol 2.6%], *Vicks VapoRub* cream [camphor 5.2%, eucalyptus oil 1.2%, menthol 2.8%, not available in Canada], and *Vicks VapoSteam* [camphor 6.2%]). Although there is the perception of improvement in symptoms of cough and congestion, evidence is lacking for its beneficial effects.

Menthol is the primary component of the essential oil of peppermint. Menthol is responsible for the feeling of congestion relief. Menthol binds to a receptor causing calcium ions to flow into cells, and lowering the external calcium concentrations. This causes a depolarization of the membrane, which is perceived by the brain as increased airflow across the nostrils. However, the opposite is true. In studies using menthol in humans, nasal airflow

resistance is increased within one minute of menthol application and this effect persists for more than three hours.² When used inappropriately (i.e., in the nostrils) inhalation of menthol can also cause aspiration, apnea, laryngoconstriction, nausea, ataxia, and cardiac and central nervous system (confusion, euphoria) toxicity.²

Camphor was originally obtained from distillation of the bark from the camphor tree. Today, it is synthetically produced from turpentine oil.^{1,3} The topical application of camphor leads to a local sensation of heat and anesthesia. In addition, it is responsible for the pungent smell which leads to the perception of efficacy, despite the lack of objective improvement in airflow resistance.^{1,3,4}

A recent case report of toxicity associated with use of *Vicks VapoRub* prompted investigators to study its effects on the airway using ferret tracheas (who have a similar airway anatomy and cellular composition to humans). The authors found that mucus secretion was increased after exposure of inflamed trachea to *Vicks VapoRub*. In addition, ciliary beat frequency, a measure of the function of respiratory cilia, was reduced. The authors hypothesized that the application of *Vicks VapoRub* may lead to mucus obstruction of small airways and increased nasal resistance.⁴

Is Vicks VapoRub Safe?

The safety of *Vicks VapoRub* has recently been questioned in the news because of a recent report of toxicity in an infant.⁴ In the case report, an 18-month old infant was brought to the emergency room with severe respiratory distress. Despite treatment for presumed asthma, the child's symptoms did not improve. Upon questioning, the caregiver reported that respiratory distress developed over 30 to 45 minutes after application of *Vicks VapoRub* under the nostrils. The

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respiratory distress improved with time and the child was discharged.

The product labeling for *Vicks* products cautions against applying under the nose or in the nostrils, and against use in children less than two years of age, but these warnings are often ignored. As a result there are about 10,000 annual reports of camphor exposures, some resulting in serious adverse effects.³ While the majority of the cases involve ingestion, a few are a result of inappropriate topical or inhalation (microwave-heated) use.¹

There are a variety of other case reports of keratoconjunctivitis, mental status changes, lipoid pneumonia, bronchospasm, hepatotoxicity, and type IV allergic reactions following the inappropriate use of *Vicks VapoRub* by the oral, dermal, or inhalation routes.⁴

Camphor Toxicity

In addition to the case reports of adverse effects associated with *Vicks VapoRub*, there are a variety of reports of toxicity due to camphor. Prior to 1982, high concentrations of camphorated oil were commercially available in the United States. However, after review by the FDA, it was concluded that the benefits of highly concentrated camphorated oil were insignificant when compared to the risk and the FDA ruled that camphorated oil cannot contain more than 11% camphor.¹ Currently, one of the few products with a high concentrations of camphor (camphor 10.8%) is the analgesic, *Campho-phenique*. This agent could potentially be ingested because it is sometimes used on cold sores and fever blisters. In Canada, camphor products containing more than 11% camphor are available, but products containing these higher camphor concentrations are schedule II and a pharmacist must dispense them.

Although camphor is not meant to be ingested orally, most of the cases of toxicity occur after ingestion. However, there are case reports following topical and inhalation therapy and from nasal drops.¹ Symptoms of camphor toxicity occur between 50 and 150 minutes after ingestion.⁵ In cases of mild poisoning, gastrointestinal symptoms are common. In more severe cases, central nervous system effects such as confusion, hallucinations, excitation, coma, and seizures leading to apnea, asystole, and death are possible.^{1,5}

Even small doses of orally ingested camphor are sufficient to be fatal to a toddler.^{5,6} Some experts recommend any child exposed to 500 mg or more of camphor be evaluated for possible toxicity.¹ This amount is found in approximately three to four teaspoons *Vicks VapoSteam* (6.2% camphor) or two teaspoons of *Vicks VapoRub Cream* (5.2% camphor).

Alternative Treatments for Cough and Congestion in Children

There are a variety of alternative measures which can be used to alleviate the symptoms of a cold in children.⁷ For example, the following should be recommended to caregivers:

- Have your child drink plenty of fluids so that they do not become dehydrated.
- Pain/fever relievers like acetaminophen (e.g., *Tylenol*) or ibuprofen (e.g., *Advil*) can help make your child more comfortable.
- For congestion, keep your child upright, or try gentle nasal suctioning, saline nose drops, or a room humidifier. Caution parents against using *Vicks VapoSteam* for vaporizers. If they use it, remind them to keep it out-of-reach of children.

Another product, *Vicks BabyRub* is available in the U.S. and Canada. However, it is a nonmedicated product containing petrolatum, aloe, rosemary (which contains a small amount of camphor), and lavender. Because it is marketed as a “nonmedicated” product, there are no studies to support its efficacy in the relief of symptoms due to cough and cold, and it is unlikely to provide therapeutic benefit.

Poison Prevention Week

Each year in the United States and Canada, Poison Prevention Week is celebrated during the third week of March. This year, Poison Prevention Week is March 15-21. There are a number of websites which are valuable for healthcare providers who want more information or materials to distribute during poison prevention week. These include:

- American Association of Poison Control Centers – www.aapcc.org. Find local poison centers and contact information. Poison centers may have materials for organizations to distribute.

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- SafeKids USA - <http://www.usa.safekids.org/poison/>. A variety of brochures, posters, safety checklists, e-cards.
- Home Safety Council - http://homesafetycouncil.org/safety_guide/sg_poison_w001.aspx. Poison prevention safety tips.
- Poison Prevention.Org - www.poisonprevention.org. Website managed by the Poison Prevention Week Council to promote safety from unintentional poisonings.
- Poison Help – www.poisonhelp.hrsa.gov. Department of Health and Human Services website.
- National Association of Pharmacy Regulatory Authorities - www.napra.org/docs/0/95/157/164/349.asp Listing of poison prevention centers and contact information in Canada.

Conclusion

Camphor- and menthol-containing products are commonly found in households with toddlers. As with all medications, these products should be kept out of reach of children. In addition, if they are used in children, extreme care should be taken to closely follow directions. As an alternative, nonpharmacologic measures should be recommended. Parents should keep the local poison control center phone number at each phone in the home. Alternatively, parents in the U.S. can call the national poison control number, 1-800-222-1222. Canadian parents can access a listing of regional poison control centres at <http://www.napra.org/docs/0/95/157/164/349.asp>.

Users of this document are cautioned to use their own professional judgment and consult any other necessary or appropriate sources prior to making clinical judgments based on the content of this document. Our editors have researched the information with input from experts, government agencies, and national organizations. Information and Internet links in this article were current as of the date of publication.

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