

Contact Dermatitis to Vicks VapoRub

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Vicks VapoRub (VVR) is a commonly used inhalant ointment that helps relieve symptoms of upper respiratory tract infections. It contains several plant substances, including turpentine oil, eucalyptus oil, and cedar leaf oil, which can potentially irritate or sensitize the skin, as well as camphor, menthol, nutmeg oil, and thymol. Although many reports describe allergic contact dermatitis (ACD) to the various constituents in VVR ointment, there are no cases of VVR directly causing ACD. We present a case of a patient who developed an ACD secondary to application of her VVR.

THE PHARMACEUTICAL MARKET offers a wide range of inhalant drug products that are first applied to the skin and subsequently evaporate, allowing for inhalation by the patient.¹ These products usually contain essential oils and their isolated compounds, terpenes and terpinoids, and exert their effects in the respiratory tract.¹

Vicks VapoRub (VVR) (Procter & Gamble Company, Cincinnati, OH), a commonly used inhalant ointment, helps relieve symptoms of upper respiratory tract infections.² It contains several plant substances, including turpentine oil, eucalyptus oil, and cedar leaf oil, which can potentially irritate or sensitize the skin.³ Additionally, it contains camphor, menthol, nutmeg oil, and thymol.³ One study examined the composition of VVR and found that each of the essential oils used in the ointment contained up to 30 other terpenes.¹ Thus, the composition can be considered fairly complex.

Although many reports describe allergic contact dermatitis (ACD) to the various constituents in VVR ointment, there are no cases of VVR directly causing ACD.^{4–8} We present a case of a patient who developed an ACD secondary to application of VVR.

Case Report

A 66-year-old female presented with a history of an acute contact dermatitis on her neck that had spread to her anterior chest. She had been using VVR to alleviate the symptoms

from her upper respiratory tract infection. The eruption lasted for weeks. This ointment contained menthol (2.6%), camphor (4.73%), eucalyptus oil (1.2%), thymol, cedar leaf oil, *Myristica* oil, turpentine oil, and special petrolatum.

The patient had been using VVR and a related product, which contained all of the ingredients in VVR, as well as mineral oils, for years. However, at the time of the acute eczematous eruption, she had only been using VVR. The patient had also been using Aveeno lotion, Aveeno skin relief lotion, Aveeno radiance lotion (Johnson & Johnson, New Brunswick, NJ), and Noritate (Sanofi-Aventis, Bridgewater, NJ). The patient had treated her contact dermatitis with a 0.5% hydrocortisone cream (Pharmasave, Langley, BC, Canada) and Polysporin (Johnson & Johnson).

The patient was otherwise healthy. She had been treated previously for perianal dermatitis and rosacea. She had been using Anusol-HC (McNeil Consumer Healthcare, Fort Washington, PA), Hyderm cream (Taro Pharmaceuticals Inc, Brampton, ON, Canada), and hydrocortisone mixed with Canesten (Bayer HealthCare, Morristown, NJ) for her anal region and Noritate for her rosacea. She suffered from allergies to both sulfa and penicillin.

The patient was patch-tested to the North American Contact Dermatitis Group (NACDG) standard screening series of 65 allergens; some additional allergens, including turpentine, cedarwood oil, eucalyptus oil, and benzoyl alcohol (Chemotechnique Diagnostics, Malmö, Sweden); and some of her own products, such as VVR, Aveeno skin relief lotion, Aveeno radiance lotion, Noritate, Anusol-HC, and PharmaSave 0.5% hydrocortisone cream. Patch testing was performed with a standardized technique with Finn Chambers (Epitest Ltd. Oy, Tuusula, Finland) on Scanpor tape (Norgesplaster A/S, Vennesla, Norway) at 48 and 120 hours after initial placement according to the NACDG guidelines.⁹

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The results of patch testing at 120 hours revealed positive reactions to her own VVR (3++), neomycin (3+), nickel (3+), dibucaine (3+), rosin (1+), Compositae plant mix (1+), sesquiterpene lactone (1+), cedarwood oil (1+), and eucalyptus oil (1+).

Discussion

In the literature, VVR is associated with keratoconjunctivitis, lipid pneumonitis, and hepatotoxicity.^{10–12} However, although VVR contains many essential oils that have been associated with ACD, this is the first report in the literature of ACD from the use of VVR.^{4–8} Our patient patch-tested positive to both VVR and to two of its constituent products, eucalyptus oil and cedarwood oil.

Contact dermatitis from eucalyptus oil has been well documented.^{4–8} It is present throughout eucalyptus trees in the leaves, fruits, buds, and bark.¹³ It contains oxidized and nonoxidized terpenes, both of which include potential sensitizers, including pinenes, linalool, citronellal, and linalyl acetate.^{7,8} One of the primary terpenes in eucalyptus oil, α -pinene, is widely distributed in essential oils; thus, cross-sensitivity is possible between the various oils.^{5,8}

Although there is some literature discussing cedarwood oil, there is none specifically describing cedar leaf oil.^{14,15} However, as the same oil is generally found throughout the various components of trees, this distinction is probably irrelevant.¹³ Cedarwood oil is known to contain the sesquiterpenes α -cedrene, β -cedrene, cedrol, cuparene, thujopsene, and widdrol, as well as other substances.¹⁴ ACD to cedarwood oil is uncommon. Cedarwood oil used for dermatoscopy and in temporary henna tattoos has been associated with ACD.^{14,15}

Compositae plants, a large group of plants commonly associated with ACD, contain several sesquiterpene lactones, the predominant allergens in Compositae plants.^{16–21} Our patient tested positive to both Compositae plants and sesquiterpene lactones. As cedarwood oil contains sesquiterpenes, these two positive tests are relevant. The patient also used Dove Body Wash (Unilever, Englewood Cliffs, NJ), which contains sunflower oil, an extract from the seeds of the sunflower (a Compositae plant).²²

Turpentine is commonly used in many liniments and cold remedies as well as in lacquers, varnishes, and paints.^{23,24} Our patient tested positive to rosin (colophony), a closely related product. Rosin and turpentine are both compounds isolated from coniferous trees.²³ Turpentine oil is distilled off and the nonvolatile residue remaining is known as rosin, which is present in many

adhesives and may cause dermatitis in sensitized individuals.^{23,24} Given their similarity, turpentine and rosin can cross-react.²³ Also of interest is that the oxidation products of turpentine oil can cause allergic sensitization and cross-react with other essential oils.^{25,26} One study tested 200 patients with 35 oils and found 3 to be positive to eucalyptus oil, 2 of which were also positive to turpentine.⁴

The other main ingredients of VVR, camphor and menthol, are rare causes of ACD. Menthol, used as a cooling agent in many products, has been associated with allergic sensitization from mentholated cigarettes and toothpaste flavors.^{27,28} Camphor oil in ear drops has been noted to cause an ACD.²⁹ Additionally, contact dermatitis due to 4-methylbenzylidene camphor and its derivatives has been reported.³⁰

Finally, our patient also patch-tested positive to neomycin. This is likely of past relevance related to an unknown exposure, possibly from an eye drop or hemorrhoid preparation.

Thus, we describe the first case in the literature of an individual developing ACD from VVR. Our patient tested positive to both eucalyptus oil and cedarwood oil, two of the main ingredients in this commonly used ointment.

Conclusion

VVR ointment contains many ingredients that are potential sensitizing agents, including eucalyptus oil, cedarwood oil, and turpentine oil. ACD has been reported in association with the various constituents of VVR. However, this is the first case of ACD secondary to the application of VVR ointment.

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