Essential oil of Australian lemon myrtle (*Backhousia citriodora*) in the treatment of molluscum contagiosum in children

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Abstract

Molluscum contagiosum is a common viral illness of childhood and is increasingly found as a sexually transmitted disease in sexually active young adults. Current treatment options are invasive, requiring tissue destruction and attendant discomfort. Thirty-one children (mean age 4.6 ± 2.1 years) with the diagnosis of molluscum contagiosum (mean length of time with condition 8.6 ± 5.3 months) were treated with once daily topical application of a 10% solution (v/v) of essential oil of Australian lemon myrtle (*Backhousia citriodora*) or vehicle (olive oil). At the end of 21 days, there was greater than 90% reduction in the number of lesions in 9/16 children treated with lemon myrtle oil, while 0/16 children met the same criteria for improvement in the vehicle group (*P* < 0.05). No adverse events were reported.

Keywords: Molluscum contagiosum, Citral, Molluscum virus

1. Introduction

Molluscum contagiosum is a common contagious viral disease of childhood occurring worldwide, with an estimated prevalence in the US of approximately 1/200 children under age 10 [1,2]. Molluscum occurs predominantly in preadolescent children, but occurs also in sexually active adults, participants in sports with skin-to-skin contact, and in those with impaired cellular immunity such as HIV positive individuals [2]. Its exact prevalence in the adult population is unknown but the incidence of sexual transmission is rapidly increasing [3].

Molluscum contagiosum virus (MCV) causes characteristic pearly, flesh-colored, dome-shaped papules with central umbilication [4]. It is a double stranded DNA poxvirus that has been sequenced [6], and like variola virus (smallpox), has not animal reservoir but is specific to humans [2]. Cell debris and virus accumulate in the crater-like central ostium [2,4], and infection is spread principally by skin contact. In immunocompetent patients the illness is self-limited and MCV infection does not recur [4]. However like other members of the poxvirus family, MCV exhibits an ability to avoid host defense mechanisms, and it is not unusual for lesions to persist and spread.

The general recommendation for treatment is expectant management [1,4], with spontaneous resolution generally occurring in 12–30 months. However, lesions may spread to the face or cover extensive portions of the body, prompting the desire for treatment. Treatment options largely depend upon tissue destruction and include curettage, cryotherapy, CO2 laser, electrodessication, or application of caustics such as trichloroacetic acid, podophyllotoxin, or cantharadin [5,6]. Recently, topical immune modulators such as imiquimod have been used with some success [7]. However, all current treatment options involve some degree of pain, discomfort, or irritation to the patient with accompanying distress to the parents of small children. In addition, treatments that rely on tissue destruction may increase the risk of infection and scarring [1,2,4,5]. Thus, the need exists for a safe, painless, effective, rapid treatment option.

The essential oil (steam distillate) from the Australian lemon myrtle (*Backhousia citriodora*) has been reported to
exhibit antibacterial actions in vitro [9,10] with low cytotoxicity [10]. After anecdotal reports suggested efficacy against molluscum, we tested a topical application of a 10% (v/v) solution of essential oil of *B. citriodora* in the treatment of children with molluscum contagiosum.

2. Study protocol

Thirty-one children (mean age 4.6 ± 3.1 years) with molluscum contagiosum were enrolled from four outpatient clinics in Boise, ID, USA between 17 February 2001 and 29 July 2001. Children were otherwise healthy without major disease, at or above the 50th percentile for height and weight, and had met all age-appropriate developmental milestones. Mean length of time with the diagnosis of molluscum was 8.6 ± 5.3 months (Fig. 1). Detailed written informed consent was obtained from the parents, and the study protocol was reviewed and approved by the regional Institutional Review Board. The diagnosis was confirmed by a dermatologist blinded to the study protocol.

Essential oil of Australian lemon myrtle leaf was purchased from Herbal BioScience (Oakvale, CA, USA). The preparation contained no preservatives, additives, alcohol, or solvents.

Children were randomized to active treatment or vehicle (virgin olive oil) by blindly choosing a token numbered from 1 to 100. Odd numbers were assigned to active treatment (essential oil of *B. citriodora* in virgin olive oil; 10%, v/v), even numbers to vehicle. Sixteen children were randomized to active treatment and 15 to vehicle. Treatment consisted of application of one drop of myrtle leaf extract (MLE) or vehicle to each molluscum lesion once daily at bedtime. Treatment was continued for 21 days or until all lesions had resolved if this required less than 21 days. Treatment was considered successful if lesions completely cleared or were reduced in number by greater than 90% by the end of day 21. Parents and physicians were blinded to treatment protocol. A treatment key was held by a participating pharmacist (no patient contact) until study completion. Participants were seen weekly to monitor progress and assess for adverse events. A mild synthetic lemon fragrance not containing citral was added to scent the control olive oil preparation. This fragrance by itself had no therapeutic effect (data not shown).

3. Results

In the MLE treated group, one child was lost to follow-up, six had reductions in the number of lesions but did not meet the 90% criterion, five had total resolution of all lesions, and four had reductions in the number of lesions greater than 90% at the end of 21 days. In the vehicle treated group, three children withdrew as the parents perceived worsening of the molluscum and sought other treatment. 0/16 met the 90% reduction criterion, and 12 had no change or an increase in lesion number. A total of 9/16 children met the 90% reduction criterion in the treatment group vs. 0/15 in the control group (P < 0.05 students t-test). The median number of lesions at enrollment was 23 ± 21 (mean ± S.E.M) and did not differ between treatment groups. Lesion number for the entire study population ranged from a minimum of seven to a maximum of 69, with a median value of 27.

Adverse effects were limited to a small amount of redness around the base of some lesions. Of the 31 children treated with MLE or vehicle control, three mothers (two MLE, one control) reported areas of redness that were concerning to them on a total of 21 molluscum lesions. No area of redness was larger than the 5 mm radius, and no lesion showed signs of infection. No patient discontinued treatment due to adverse reactions, and no child displayed signs of discomfort from application of MLE according to parental report. The difference in incidence of reports of redness around lesions between MLE and control group was not statistically significant. There was no blistering or other sign of gross cytotoxic effect from application of either the 10% MLE or vehicle for the duration of this study.

There was no correlation between the number of lesions in a patient at the beginning of the study, and treatment effect.

4. Discussion

MCV is a cytoplasminically replicating virus possessing a complex genome encoding approximately 182 proteins [6], and exhibits genetic heterogeneity with several strain re-
Fig. 2. Molecular structure of citral (cis-3,7-dimethyl-2,6-octadienal; CAS 5392-40-5). Citral is the most abundant compound found in essential oil of B. citriodora.

ported [8]. The genetic makeup of the MCV in this study is unknown. Furthermore, it is unclear if genetic heterogeneity contributed to the differential effects observed, with some strains being sensitive to MLE application while others were not.

The speed of action of MLE and a lack of generalized inflammation associated with its use suggested that the mixture was not acting as an immune stimulant (e.g., Aldara), but rather acted more directly to inhibit viral propagation. Further, the lack of generalized cytotoxic effects in this study suggests that the MLE was not acting by non-specific tissue destruction.

Citral (cis-3,7-dimethyl-2,6-octadienal; CAS 5392-40-5) is the principal component in Australian lemon myrtle [9,10] (Fig. 2). However, it is unknown if this is the active agent responsible for the effects seen here. Wilkinson et al. [9] reported that the antibacterial action of four samples of essential oil of B. citriodora varied, and that the variation in antibacterial action did not correlate with the citral content. Thus, it is possible that a component or components other than citral may be responsible for the clinical effects seen here.

The essential oil of Australian lemon myrtle appears moderately efficacious and safe in the treatment of molluscum contagiosum in children. While high concentrations of B. citriodora oil have exhibited cytotoxic effects in human fibroblast cell lines in culture [10], there were no signs of toxicity in this study, such as blistering, inflammation, rash, pain, etc.

Further work is needed to identify the active ingredient(s) responsible for the clinical effect and to further assess safety and efficacy.

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References