Journal of Hospital Infection (2000) **46**: 236–237
doi:10.1053/jhin.2000.0830, available online at http://www.idealibrary.com on IDEAL®

SHORT REPORT

Tea tree oil as an alternative topical decolonization agent for methicillin-resistant *Staphylococcus aureus*

M. Caelli*, J. Porteous*, C. F. Carson†, R. Heller* and T.V. Riley†

**Department of Clinical Epidemiology, University of Newcastle, Callaghan, NSW 2308 and †Department of Microbiology, The University of Western Australia, Nedlands, WA 6009, Australia*

Summary: The combination of a 4% tea tree oil nasal ointment and 5% tea tree oil body wash was compared with a standard 2% mupirocin nasal ointment and triclosan body wash for the eradication of methicillin-resistant *Staphylococcus aureus* carriage. The tea tree oil combination appeared to perform better than the standard combination, although the difference was not statistically significant due to the small number of patients.

Keywords: Tea tree oil; mupirocin; MRSA.

Introduction

The carriage and subsequent dissemination of methicillin-resistant *Staphylococcus aureus* (MRSA) by hospital staff and patients is a recognized risk for hospital-acquired infections. The emergence of mupirocin-resistant MRSA[1] potentially compromises our ability to eradicate the carrier state and alternative agents have been suggested. One such agent is tea tree oil, an essential oil steam distilled from the leaves of the Australian native plant *Melaleuca alternifolia*.[2] Tea tree oil is considered an effective topical antimicrobial agent *in vitro*, with good activity against a variety of bacteria, including both mupirocin susceptible and resistant MRSA.[3] However, little clinical data are available to justify its use.[4]

Methods

A pilot study to evaluate the clinical efficacy of tea tree oil in the eradication of MRSA was undertaken at the John Hunter Hospital, a 624-bed acute referral teaching hospital in Newcastle, NSW, Australia. A total of 30 adult inpatients, either infected or colonized with MRSA, was recruited during the nine-month period between December, 1997 and August, 1998. After informed consent was obtained, participants were randomly allocated to receive either 2% mupirocin nasal ointment and triclosan body wash [routine care (RC)] or a 4% tea tree oil nasal ointment and 5% tea tree oil body wash (provided by Australian Bodycare Pty Ltd) [intervention care (IC)] for a minimum of three days. Screening for MRSA, from the nares, the perianal region and any site previously positive for MRSA, was undertaken 48 and 96 h after the cessation of topical treatment. Results were analysed on an intention-to-treat basis.

Results

A summary of outcomes is given in Table I. The number of infected patients in the RC and IC groups was similar (6/15 vs. 8/15, respectively). The most common site of isolation of MRSA was skin, accounting for 19 of 30 patients (63%). All infected patients received IV vancomycin in addition to the decolonization regimen. RC participants

Received 10 November 1999; revised manuscript accepted 25 February 2000.
Author for correspondence: Associate Professor Thomas V. Riley, Department of Microbiology, Queen Elizabeth II Medical Centre, Nedlands, WA 6009, Australia.

0195-6701/00/030236+02 $35.00

Table 1 *Trial outcomes*

Parameter	RC ($N=15$)	IC ($N=15$)
Average age (years)	74 (range = 45–87)	58 (range = 28–82)
Male	7 (47%)	5 (33%)
Infected	6 (40%)	8 (53%)
Skin isolate	9 (60%)	10 (67%)
Average treatment days	5.6 (range = 2–14)	10.7 (range = 1–34)
Cleared	2 (13%)	5 (33%)
Chronic	8 (53%)	3 (20%)
Incomplete	5 (33%)	7 (47%)

were older [average age 74 years (range 45–87)] and had a shorter average treatment period [5.6 days (range 2–14 days)] than IC participants [58 years (range 32–82)] and [10.7 days (range 1–34 days), respectively]. There was no apparent correlation between length of treatment and outcome in either group. Two evaluable patients in the IC group were treated for 34 days: one cleared while one remained chronically infected. Five bottles of body wash and 1.8 tubes of nasal ointment per RC participant, and 10 bottles of body wash and 1.5 tubes of nasal ointment per IC participant, were used.

Five and seven of the RC and IC groups, respectively, failed to complete treatment for various reasons. Eight of the RC group (53%) and three of the IC group (20%) remained chronically infected or colonized at the end of treatment. Five of the IC group (33%) were initially cleared of MRSA carriage, compared to two (13%) of the RC group. Adverse events for the tea tree oil nasal ointment ranged from mild swelling of the nasal mucosa to an acute burning upon application. One participant complained of skin tightness after using the triclosan body wash. No adverse events were recorded for either the tea tree oil body wash or mupirocin nasal ointment.

Discussion

There has been much debate as to whether the control of MRSA is both worthwhile and feasible. Various local and national policies have been drafted which, with few exceptions (such as Western Australia[5]), have failed to achieve the objective of controlling MRSA, particularly in the large teaching hospital setting. Lacey[6] argued early on for abandoning expensive and time-consuming strategies and putting more effort into reducing the excessive and inappropriate antibiotic prescribing that selects for MRSA. Barrett *et al.*[7] continued to argue that the fight against MRSA was lost, although when examined objectively, screening and control programmes for MRSA are cost-effective.[8]

Eradication of MRSA colonization can be difficult, although clearance rates of over 50% with mupirocin-based regimens have been reported for both mupirocin-susceptible and low-level resistant strains of MRSA.[9] The appearance of MRSA with high-level mupirocin resistance has made treatment of carriage more difficult[1] and alternative agents are urgently needed. In our pilot study, a combination of tea tree oil products performed better than mupirocin and triclosan, although the number of patients was too small for the difference to be statistically significant. Our results do suggest, however, that larger studies are warranted.

Acknowledgements

This study was supported by grants from the Cavell Trust, the Rural Industries Research and Development Corporation and Australian Bodycare Pty Ltd. The assistance of staff at the John Hunter Hospital is greatly appreciated.

References

1. Cookson BD. The emergence of mupirocin resistance: a challenge to infection control and antibiotic prescribing practice. *J Antimicrob Chemother* 1998; **41**: 11–18.
2. Carson CF, Riley TV. Antimicrobial activity of the essential oil of *Melaleuca alternifolia*. *Lett Appl Microbiol* 1993; **16**: 49–55.
3. Carson CF, Cookson BD, Farrelly HD, Riley TV. Susceptibility of methicillin-resistant *Staphylococcus aureus* to the essential oil of *Melaleuca alternifolia*. *J Antimicrob Chemother* 1995; **35**: 421–424.
4. Carson CF, Riley TV, Cookson BD. Efficacy and safety of tea tree oil as a topical antimicrobial agent. *J Hosp Infect* 1988; **40**: 175–178.
5. Riley TV, Rouse IL. Methicillin-resistant *Staphylococcus aureus* in Western Australia, 1983–1992. *J Hosp Infect* 1995; **29**: 177–188.
6. Lacey R. Mutli-resistant *Staphylococcus aureus* – a suitable case for inactivity? *J Hosp Infect* 1987; **9**: 103–105.
7. Barrett SP, Mummery RV, Chattopadhyay B. Trying to control MRSA causes more problems than it solves. *J Hosp Infect* 1999; **39**: 85–93.
8. Papia G, Louie M, Tralla A, Johnson C, Collins V, Simor AE. Screening high-risk patients for methicillin-resistant *Staphylococcus aureus* on admission to the hospital: is it cost effective? *Infect Control Hosp Epidemiol* 1999; **20**: 473–477.
9. Schmitz F-J, Jones ME. Antibiotics for treatment of infections caused by MRSA and elimination of MRSA carriage. What are the choices? *Int J Antimicrob Agents* 1997; **9**: 1–19.