

Occupational sensitization to polyhexamethylene guanidine hydrochloride in a non-alcoholic hand rub

Kati Pummi^{1,2}, Elina Kemppi¹ and Kaija Lammintausta¹

¹Department of Dermatology, Turku University Hospital, 20521 Turku, Finland, and ²Department of Pathology, University of Turku, and Turku University Hospital, 20521 Turku, Finland

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Correspondence: Dr Kaija Lammintausta, Department of Dermatology, Turku University Hospital, P.O. Box 52, 20521 Turku, Finland. Tel: +358 2 313 1609; Fax: +358 2 3131047. E-mail: kaija.lammintausta@tyks.fi

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Hand hygiene is a powerful tool for the prevention of nosocomial infections. Alcoholic hand rubs are well tolerated and effective in most situations, but non-alcoholic choices are also needed. Polyhexamethylene guanidine hydrochloride (PHMGH) (CAS 57028-96-3) has been considered as a potential choice (1, 2).

Case Report

A 39-year-old nurse had been working in the health centre ward for 10 years. She had a history of atopic dermatitis and occasional skin problems. In recent years, hand rubs had been used up to 60 times daily. Non-alcoholic PHMGH 0.3% containing Desisoft® (Oy Soft Protector Ltd, Espoo, Finland) and Medisoft NoA® (PHMGH 0.1–1%) (Oy Transmeri Ab, Espoo, Finland) were introduced in March 2011. Our patient used these non-alcoholic disinfectants many times daily until May, when she started to suspect that some redness and itching was being caused by one of them. Thereafter, she only used Desisoft® occasionally. In the middle of June, she experienced oedematous, red and itching dermatitis in both hands. When she attended the dermatology clinic, redness and flaking with papules was seen on the back of the hands, extending to the wrists and arms.

Patch testing was carried out with the baseline series, and with the series of cosmetics, preservatives and rubber chemicals. The tests were read and interpreted according to the International Contact Dermatitis Research Group criteria, and 1+ reactions were seen to nickel sulfate and to cobalt chloride. Hand rubs were tested with a semi-open application test. About 0.050 ml of each liquid was applied with a cotton swab on a 2-cm² area, allowed to dry, covered with Scanpor® tape (Norgesplaster A/S, Vennelesla, Norway), and removed 2 days later (D2). At D2 and D4, oedematous redness was elicited by both Desisoft® and Medisoft NoA®. These were negative in 10 corresponding controls. PHMGH,

delivered by Oy Soft Protector Ltd and Oy Transmeri Ab, was afterwards tested with different concentrations, and 2+ patch test reactions were seen to all concentrations until 0.0003%, which was negative in 8 controls. The patient returned to work 2 months later, and avoided non-alcoholic hand rubs. She had no skin problems 2 months later.

Discussion

PHMGH is a cationic antimicrobial biocide with broad-spectrum activity against gram positive and gram negative bacteria (1). It is colourless, water-soluble, and non-toxic for human and animal cells. PHMGH is effective against methicillin-resistant *Staphylococcus aureus* (1) and *Escherichia coli* at very low concentrations (2). It appears to be an ideal disinfectant for hospital use. Our patient developed sensitization within 1–2 months when she applied it at a 0.1–1% concentration many times daily, 5 days a week. She probably had some irritant dermatitis prior to the sensitization.

We could not find cases of PHMGH sensitization in the literature, but polyhexamethylene biguanidine (PHMBG) sensitization has been described (3). PHMBG has been used as a disinfectant in swimming pools and as a preservative in cosmetics and personal care products. PHMGH is probably not a strong sensitizer, but, when it is used by employees regularly performing wet work in hospitals, the risks are high, as basic irritation often already exists.

References

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