Lichenoid contact dermatitis secondary to methylisothiazolinone (MI)

James Raymond, BComLLB(Hons), Bpharm, MBBS, Mtax, LLM, Mmed,[a] Joseph Konya, MBBS, MMed, FACD,[b] and Sophie Bakis-Petsoglou, MBBS, BA, MMed(ClinEpi), FACD[c]
New South Wales, Australia

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INTRODUCTION

Methylisothiazolinone and methylchloroisothiazolinone (MI/MCI) are broad-spectrum preservatives widely used in cosmetics and household and industrial products. It is well known that MI/MCI can cause allergic contact dermatitis with a spongiotic reaction pattern.[1] Because of this reaction, restrictions have been placed on the concentration of MI/MCI used in products.[2] In recent years the prevalence of allergic contact dermatitis to isothiazolinone preservatives, namely, MI/MCI, has increased dramatically.[3] Cosmetic products are some of the major sources of exposure.

Lichenoid reactions are rare in allergic contact dermatitis.[4] To our knowledge, the occurrence of lichenoid contact dermatitis to MI/MCI has not been reported. We report a case of photo-aggravated lichenoid contact dermatitis in a 63-year-old man secondary to MI.

Abbreviations used:

MCI: methylchloroisothiazolinone
MI: methylisothiazolinone

CASE REPORT

A 63-year-old man with Fitzpatrick skin type 5 was referred for assessment and management of an acute (4 month) on chronic (3 years) history of a pruritic, photo-distributed rash in February 2014. The rash was clinically suggestive of a photo-aggravated eruption with lichenoid features. Distinctly violaceous plaques affected the scalp, the lower third of the forehead, the medial cheeks, the temples bilaterally (Fig 1) and a fixed erythematous plaque appeared on the V of the patient's anterior neck. Scattered similar plaques were seen on the left forearm and trunk (the latter more suggestive of psoriatic plaques). This eruption occurred on a background of a 3-year history of a pruritic, scaly, nonlichenoid-appearing facial eruption that had been managed with emollients only. Medical history included plaque psoriasis (managed with calcipotriol/betamethasone ointment and topical coal tar/salicyclic acid preparations) and hypertension managed with a calcium channel blocker (amlodipine), which was changed to an angiotensin-converting enzyme inhibitor (perindopril) in mid December 2013. The patient was clear that the change to perindopril postdated the onset of the lichenoid rash. Other long-term medications (metformin and atorvastatin) remained unchanged. The patient took no other prescription or over-the-counter medications.

Treatment of the rash before dermatology referral was with oral prednisone for at least 3 months. The patient was reluctant to wean the dose beyond 10 mg on alternate days, as his symptoms recurred when he did. Punch biopsies were taken (while on prednisone) from the left scalp and right upper chest, and an autoimmune blood screen was requested. Histopathology findings were nonspecific, reporting possible lichen simplex chronicus, drug reaction, or syphilis with the presence of numerous plasma cells (Fig 2). Importantly, cutaneous lupus was excluded. Syphilis serology, antinuclear antibody, extractable nuclear antigen, and double-stranded DNA were all negative.

From Mid-North Coast Area Health Service (NSW)[a]; The Skin Hospital Westmead, Sydney Adventist Hospital & Epping Dermatology (private practice)[b]; and Hills Dermatology (private practice).[c]

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Correspondence to: James Raymond, BComLLB(Hons), Bpharm, MBBS, Mtax, LLM, Mmed, PO Box 2, Kempsey, New South Wales 2440, Australia. E-mail: jwraymond75@gmail.com.

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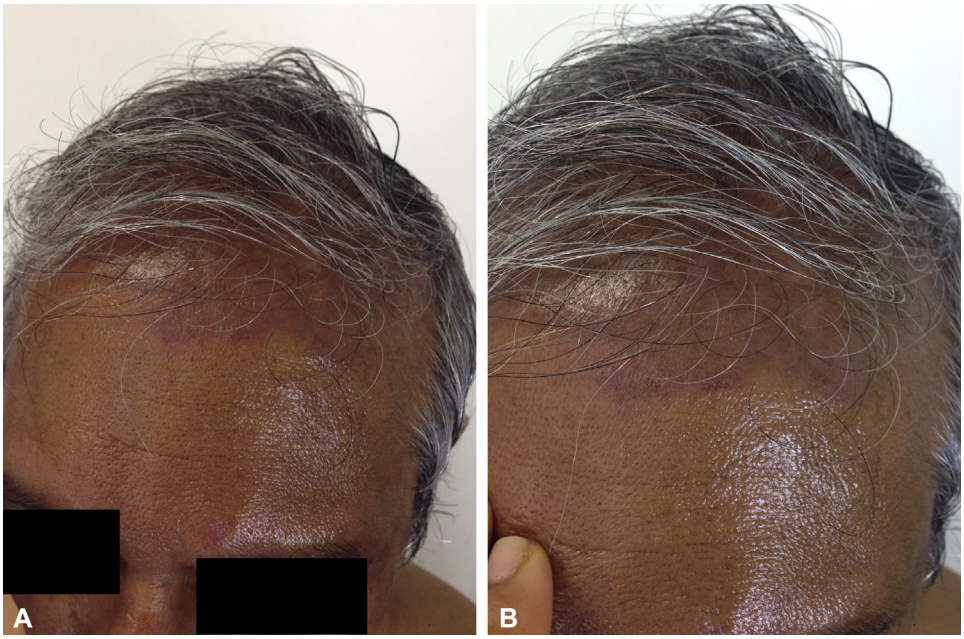

Fig 1. **A** and **B**, Rash at presentation.

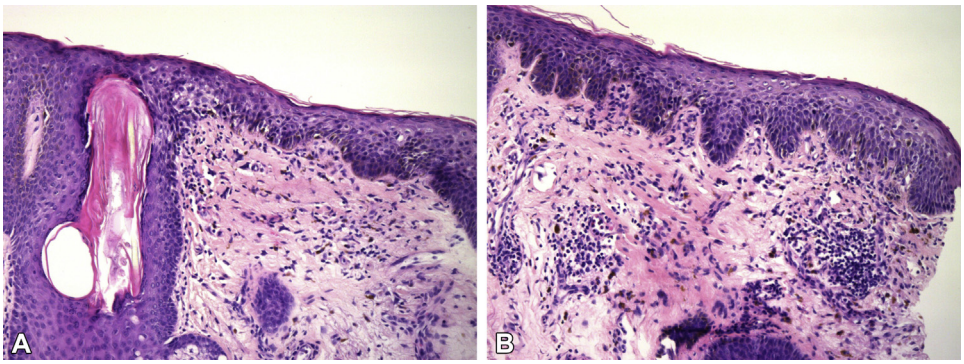

Fig 2. **A** and **B**, Lichenoid reaction pattern on histopathology.

Before repeat punch biopsies were taken, the patient was weaned off the oral steroids. Control of the symptoms was achieved with topical betamethasone dipropionate, 0.05% daily, to the affected areas and methylprednisolone aceponate applied daily to the face until 2 weeks before taking repeat punch biopsy specimens. Repeat biopsies were performed given the nonspecific results of the initial biopsies. These sections were taken from the left sides of the cheek, jaw line, and forehead and from the right side of the chest wall. All 3 specimens from the head and neck showed primarily a spongiotic tissue reaction. In addition, however, the specimen from the left cheek showed patchy vacuolar change with occasional apoptotic cells and pigment incontinence, suggesting a lichenoid reaction pattern consistent with the clinical pattern seen. Staining for IgG, IgM, IgA, and fibrinogen were negative. Importantly again, no evidence of lupus was seen.

The topical steroid regime resulted in some improvement, but the patient continued to have persistent activity in the head, neck, and trunk region. The patient was referred for extensive patch and photo patch testing. Patch testing was performed (using Chemotechnique IQ-Ultra chambers) with the department's baseline series, preservatives and antimicrobial series, bases of creams series, perfume series, photo allergens series, and extra allergens (including the patient's own moisturisers and Ionil T shampoo). MI/MCI 100 ppm (Chemotechnique) was used. The patient was not tested with MI alone, as MI (200 ppm) was added to our standard series shortly after the testing of this patient. Test reactions were read at days 2 and 4 according to International Contact Dermatitis Research Group guidelines. For photo-patch testing, duplicate allergens were applied to the back and forearm for 2 days. After removal on day 2, a primary

reading was obtained, and the forearm site was irradiated with 5 J/cm^2 of ultraviolet A and read again on day 4. Positive reactions were seen to p-phenylenediamine 1.0% in petroleum at day 2 (++) and day 4 (−/+), N-Isopropyl-N-phenyl-4-phenylenediamine (IPPD) 0.1% in petroleum at day 2 (++) and day 4 (+), MI and MCI 0.01% in petroleum day 2 (+) and day 4 (++). No past or present contact history could be identified to the IPPD. The patient denied any use of hair dyes or henna tattoos. The reactions to the p-phenylenediamine and IPPD were considered to represent some past sensitivity not relevant to the current presentation.

On further examination of his personal care products, the patient identified MI on the label of his bottle of Kenkay Body Wash that he had been applying predominantly to the head and neck. E-mail communications with Kenkay Pharmaceuticals in NSW, Australia, confirmed that there were 2 formulations for the body wash: (1) the formulation before August 7, 2013, which contained MI at a concentration of 0.0095% and (2) the formulation after August 7, 2013, which includes piroctone olamine (which replaces MI), benzoyl peroxide, ethylenediaminetetraacetic acid (EDTA), and glycerin. The authors did not further test the product itself. A repeat open application test to the Kenkay Body Wash was not performed, as the patient opted for ceasing use of the product instead.

Ceasing use of this product and continuation of topical corticosteroid therapy saw significant improvement of the rash. At 6-month review after cessation of the Kenkay Dermatological Body Wash, most of the lichenoid eruption had cleared leaving only a small very faint asymptomatic persisting patch of erythema on the left medial cheek that was managed with 1% hydrocortisone ointment twice a day. At 9-month follow-up, all the signs and symptoms had cleared. Importantly, no change was made to the patient's medications, and he continued his perindopril, atorvastatin, and metformin.

DISCUSSION

We present a case of lichenoid contact dermatitis caused by MI within a wash-off personal care product. Isothiazolinone preservatives are widely used in cosmetic and personal care products. The most frequently found isothiazolinones in these products are MI/MCI.[5] These agents have gained prominence since the 1980s, causing an epidemic of allergic contact dermatitis. A 3:1 concentration of MI/MCI was found to be a strong sensitizer in adults and children,[6] and that combination was gradually replaced with sole use of MI, as it was considered to be a weaker sensitizer. Notwithstanding, the incidence of allergic contact dermatitis has increased because the concentration of MI required to achieve adequate biocidal activity is greater than the combination of MCI/MI.[7] Research finds that the individuals most at risk are women older than 40 years with facial eczema who use cosmetics.[3] Moreover, in those sensitized, most products used were either leave-on products or wet wipes as opposed to rinse-off products like shampoos.[8]

In Europe, MI/MCI use is precluded in leave-on cosmetic products, but 15 ppm is considered safe in rinse-off cosmetic products.[2] Yazar et al[9] identified no safe level for MI/MCI in rinse-off products. MI/MCI continues to be used in household and other consumer products without restriction on concentration.[10]

Irritant or allergic contact dermatitis usually presents as an eczematous process. Lichenoid contact dermatitis is a rare form of noneczematous contact dermatitis with clinical features resembling lichen planus involving potentially skin and/or mucosal membranes. Lichenoid contact dermatitis has been reported with color developers, such as paraphenylenediamine and its derivatives, nickel, epoxy resins, aminoglycoside antibiotics, and methacrylic acid esters for industrial use.[4] Lichenoid drug eruption is an important consideration to be excluded. Angiotensin-converting enzyme inhibitors, amlodipine, and beta blockers are among several reported causes of lichenoid drug eruptions.[1] Clinically, these lesions may mimic lichenoid contact dermatitis. The histopathology, however, usually shows prominent vacuolar change, civatte bodies, melanin incontinence, and inflammatory infiltrate approximating the dermo-epidermal junction extending up to mid epidermis and dermis.[1] In our case, the histopathology findings showed predominantly spongoisis with some patchy basal cell vacuolar change, an occasional apoptotic cell, and some associated pigment incontinence more consistent with a lichenoid contact reaction pattern rather than a drug eruption. In addition, the patient's skin eruption only began to definitively clear when use of the Kenkay Body Wash was ceased.

Although MI is reported to cause a flare in preexisting oral lichen planus,[11] there are no previously reported cases of MI/MCI causing de novo lichenoid contact dermatitis as far as the authors are aware at the time of submission. Pirmez et al[12] recently reported 3 confirmed and 27 suspected cases of photoaggravated allergic contact dermatitis secondary to MI/MCI, but none had any lichenoid features histologically.

The case presented is notable because it is the first reported case of a clinically photo-distributed lichenoid contact dermatitis secondary to exposure to MI. This case also highlights the importance of considering MI/MCI as a causative agent for lichenoid eruptions and adds weight to the argument for the removal of MI/MCI as a preservative agent from, at least, all cosmetic products.

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