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## ‘Mislabelled’ make-up remover wet wipes as a cause of severe, recalcitrant facial eczema

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The preservative methylchloroisothiazolinone (MCI)/methylisothiazolinone (MI) is a well-known sensitizer. MI alone has been used as a preservative in occupational and household products, and in cosmetics, for <10 years. In the last few years, an epidemic of contact allergy to MI and allergic contact dermatitis caused by MI has been seen in Europe and the United States (1). Numerous articles have been published on facial dermatitis in women resulting from the use of cosmetics and skin care products, and hand eczema resulting from the use of occupational products such as water-based paints, coolants, and fillers, and household objects such as wet wipes for intimate hygiene or baby care (2–5).

### Case Reports

#### Case 1

A 33-year-old non-atopic female catering assistant worked in a restaurant for several years without any skin problems. She was referred because of a 1.5-year history of hand eczema and angioedema. Her angioedema had been treated with internal intermittent corticosteroids and antihistamines, without success, and her hand eczema with various topical corticosteroids. A patch test 2 years prior to presentation had shown contact allergy to nickel sulfate, fragrance mix I, and MCI/MI. According to the referral note, the patient had avoided the allergens in question, but her hand eczema had not resolved. At presentation, she showed a picture of herself with the

‘angioedema’ (Fig. 1). When she was patch tested with the Swedish baseline series (Chemotechnique Diagnostics, Vellinge, Sweden), she reacted to both MCI/MI and MI (Table 1; Fig. 2). When questioned, she admitted to having used make-up remover wet wipes (Gunry AB, Kungsbacka, Sweden) before she had her ‘angioedema’, which looked like eczema from the pictures (Fig. 1). The wipes were not labelled as containing MCI/MI, but were labelled as containing phenoxyethanol (Fig. 3), which is why we analysed them chemically (Table 2). The patient was later tested with several separate ingredients of the wipes (with negative results), with the wipes ‘as is’, with an extract of the wipes, and with a serial dilution of several isothiazolinones (6) (Table 1). She also found a shampoo that she used at home containing MCI/MI. Her facial eczema and hand eczema resolved completely after avoiding the wipes and the shampoo.

#### Case 2

A 54-year-old non-atopic female shop attendant had worked selling liquor for 25 years, and had never experienced any skin problems. Her current workplace had been situated in a shopping mall for 1.5 years, and the patient had worked there for almost 5 months before presentation. Within 3 days after she had started working there, erythema and pruritus around the eyes, and watery eyes with smarting pain developed. At home, she was without symptoms. A visit to a general dermatologist 2 months later resulted in a suspicion of pollen allergy, however, blood tests gave negative results. Ophthalmological examination did not show any abnormal findings. One week’s vacation improved the patient’s dermatitis, but the skin problems reoccurred within 1.5 weeks of her resuming work. Several attempts were made to treat her dermatitis with a group 2 corticosteroid topically, without much

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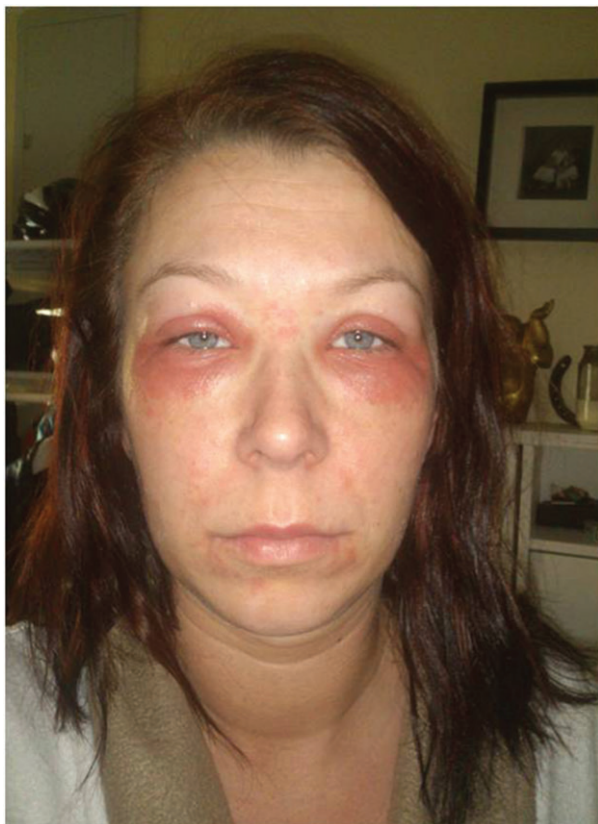


**Fig. 1.** Patient 1 with 'angioedema'.

success. The eczema later also occurred on her neck. Two weeks of sick leave led to almost complete healing. Each time the patient returned to work, her symptoms reoccurred. Because of a suspicion of work-related dermatitis, she was referred to us. At presentation 4.5 months after the onset of facial dermatitis, she still had some patchy eczematous lesions below the eyes, on the forehead, on the right temple, and on the neck. She informed us that several other shop attendants had experienced similar symptoms. A make-up remover wipe that the patient said she used was suspected to be the cause. The reason for this was the periorbital dermatitis and the fact that we had analysed this brand of wet wipes and found levels of MCI/MI high enough to elicit contact dermatitis without being listed on the package. The patient was patch tested with the Swedish baseline series and a cosmetic series (Table 1), and also with work-related items that she had brought. As she reacted to MCI/MI and MI and her dermatitis worsened after the patch testing, a worksite visit was made. Items that were collected were later tested; however, no reactions to these were noted. The wipes were tested 'as is', and also analysed for the presence of MCI/MI (Table 2). It later turned out that the patient only

**Table 1.** Test results in the 3 patients; D3 and D7 readings

| Test substance             | Concentration (ppm) | Case 1 |    | Case 2 |    | Case 3 |    |
|----------------------------|---------------------|--------|----|--------|----|--------|----|
|                            |                     | D3     | D7 | D3     | D7 | D3     | D7 |
| MCI/MI                     | 200                 | +++    | +  | ++     | +  | -      | -  |
| MI                         | 2000                | +++    | *  | ++     | +  | +      | -  |
| MCI                        | 150                 | -      | ND | +++    | +  | -      | -  |
| Octylisothiazolinone       | 1000                | -      | ND | NT     | NT | NT     | NT |
| Wet wipe 'as is'           | -                   | -      | ND | -      | -  | NT     | NT |
| Extract of wet wipe in aq. | -                   | -      | ND | NT     | NT | NT     | NT |
| MI                         | 1000                | +++    | ND | NT     | NT | NT     | NT |
| MI                         | 500                 | (+)    | ND | NT     | NT | NT     | NT |
| MI                         | 250                 | -      | ND | NT     | NT | NT     | NT |

MCI, methylchloroisothiazolinone; MI, methylisothiazolinone; ND, not done; NT, not tested.

All tested in aq.

\*Treated with potent corticosteroid.

wore make-up at work, and hence never used the wet wipes when off work. When she ceased using these wipes, her dermatitis disappeared.

### Case 3

A 50-year-old atopic woman presented with a history of watery eyes, some pruritus, and smarting pain in the eyes, and later eczematous lesions on the neck and on the chest, in addition to oedema around the eyes, which had not disappeared at presentation. Some erythema on the chest also remained. She was tested with the Swedish baseline series, the cosmetic series, and some personal cosmetics. Positive reactions are shown in Table 1. There was no mention in the hospital file of any products containing any sensitizer that the patient had reacted to. This patient was re-examined 6 months later, when she was taking part in a scientific study. She then claimed that she had problems with her eyes, which were irritated with a smarting pain, and that her eyelids sometimes became red and oedematous. Having seen cases 1 and 2 using the same brand of make-up remover wet wipes, we asked this patient whether she used these wet wipes, and she admitted to using these both on the face and on the chest. Chemical analyses of wipes from six packages of the make-up remover wipes showed similar results (Table 2). When she ceased using the wipes, her dermatitis cleared completely within weeks.

### Patch Testing

Patch testing was performed with IQ Ultra<sup>®</sup> patch test chambers (Chemotechnique Diagnostics) covered with Scanpor<sup>®</sup> tape (Norgesplaster A/S, Vennessla, Norway)



**Fig. 2.** Positive patch test reaction to methylisothiazolinone (MI) 1000 ppm and doubtful patch test reaction to MI 500 ppm in patient 1.

in case 1, and with Finn Chambers® (diameter 8 mm) (Epitest Oy, Tuusula, Finland) in cases 2 and 3. The readings were performed on D4 and D7, according to ICDRG criteria. Positive results are shown in Table 1.

## Chemical Investigation

Ethyl acetate and acetonitrile were obtained from BDH Prolabo (Fontenay-sous-Bois, France), MCI/MI was obtained from The Dow Chemical Company (Midland, MI, USA), and MilliQ (deionised) water was obtained from Millipore (Molsheim, France). All wipes were chemically analysed with high-performance liquid chromatography (HPLC). Wipes a and b (measuring approximately 20 × 20 cm) were not cut into smaller pieces, but were fully extracted in ethyl acetate; the solution was then evaporated to dryness and dissolved in acetonitrile/water (30%/70% vol/vol). The resulting solution was filtered and used for the HPLC analysis. From wipes c–f, a 10 × 10-cm piece was cut, and this was then extracted in 10 ml of acetonitrile/water (30%/70% vol/vol) in an ultrasonic

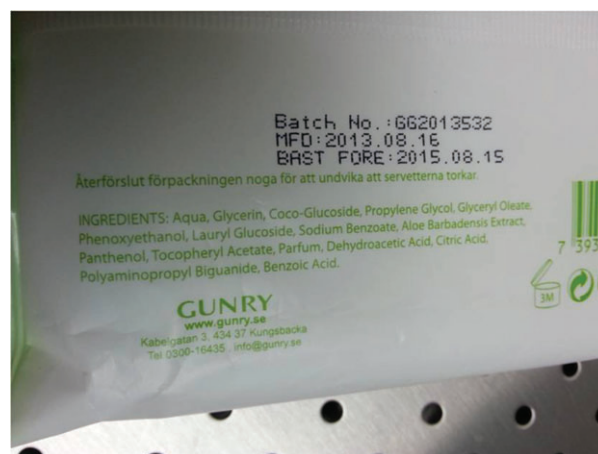


**Fig. 3.** Back of the package of wet wipes with labelled ingredients.

**Table 2.** The amount of methylchloroisothiazolinone (MCI)/methylisothiazolinone (MI) in the make-up remover wet wipes

| Wet wipes and packages | Weight (g) of each wipe when fresh/wet | Weight per 10 × 10 cm <sup>2</sup> of each wipe (g) | Amount of MCI/MI (µg/wipe) |
|------------------------|----------------------------------------|-----------------------------------------------------|----------------------------|
| Wipe a                 | NN                                     | NN                                                  | 54                         |
| Wipe b                 | NN                                     | NN                                                  | 58                         |
| Wipe c                 | 6.84                                   | 1.64                                                | 83                         |
| Wipe c                 | 6.64                                   | 1.54                                                | 79                         |
| Wipe d                 | 5.27                                   | 1.06                                                | 57                         |
| Wipe e                 | 6.74                                   | 1.61                                                | 63                         |
| Wipe f                 | 6.67                                   | 1.52                                                | 61                         |
| Wipe c                 | 6.86                                   | 1.60                                                | 75                         |

NN, not noted. c: from the same package, batch no. GG20140065. d, e, and f: from three different packages, batch no. GG20140065.

bath for 5 min. The resulting solution was filtered and used for the HPLC analysis. A ThermoFinnigan system was used, consisting of a P4000 quaternary pump, an ultraviolet (UV) 6000 diode array detector, and an AS3000 autoinjector (ThermoFinnigan, San José, CA, USA). The system was software-controlled by CHROMELEON 7 (Fisher Scientific, Gothenburg, Sweden). The injection volume was 20 µl. The column (4.6 mm internal diameter × 250 mm) was packed with Nucleosil (100 Å, 5 µm) (Macherey-Nagel & Co., Düren, Germany). The flow rate was 1.0 ml/min. The detector scanned the eluate in the range 200–400 nm. The isocratic elution was performed with acetonitrile/water (30%/70% vol/vol). The identity of the substances was determined from the retention time and the UV spectrum. The detection limit was <0.05 ppm. A sample of Kathon® CG (Rohm and Haas, Philadelphia, PA, USA) was used as a reference for MCI and MI.

## Discussion

All 3 patients had been using the same brand of make-up remover wet wipes, all containing the preservative MCI/MI at concentrations sufficient to elicit allergic contact dermatitis and without any labelling indicating that this preservative was present in the wipes (Fig. 3). According to the manufacturer, they were 'suitable for all skin types' and also 'dermatologically and ophthalmologically tested'. The first case led to a report to the Medical Products Agency (MPA). This authority has since taken action against the company, and as of 10 February 2015, the MPA has forbidden the sale of these wet wipes. The clinical picture in the 3 cases was very similar, with lesions being more oedematous than eczematous, owing to the thin, loose tissue around the eyes, as in allergic

contact dermatitis caused by *p*-phenylenediamine allergy after hair colouring procedures. As MCI/MI contact allergy is very common, it is of vital importance for cosmetics to be correctly labelled, so that our patients can rely on what they apply to their skin. None of the patients suspected the wipes, even though case 2 never used make-up while off work, and consequently did not use the wipes during periods off work, making a strong relationship with the wipes (or the make-up) quite apparent. The clinical picture in case 1 even led one dermatologist to consider angioedema. The possibility of performing chemical investigations was vital for the solution of these cases, in particular as the patch testing with the wipes 'as is' in cases 1 and 2 gave negative results.

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