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Author/s:
Felmingham, C;Nixon, R;Palmer, A;Lee, A

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Felmingham Claire (Orcid ID: 0000-0002-3443-8065)

Allergic contact dermatitis caused by benzisothiazolinone in a continuous positive airway pressure mask liquid soap

Claire Felmingham, Rosemary Nixon, Amanda Palmer, Adriene Lee

The Skin and Cancer Foundation Inc., Carlton, Victoria, Australia

Correspondence:
Dr. Claire Felmingham,
The Skin and Cancer Foundation Inc.,
Occupational Dermatology Research and Education Centre,
Level 1/80 Drummond St., Carlton, Victoria, Australia
clairefelmingham@gmail.com

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As important allergens methylisothiazolinone (MI) and methylchloroisothiazolinone (MCI) are removed from products, their replacements, including other isothiazolinones, may emerge as significant allergens. We report a case of allergic contact dermatitis of the hands to benzisothiazolinone (BIT) after exposure to a liquid soap and a dishwashing concentrate.

Case Report:

A 66 year old retired cleaner presented with a longstanding history of pruritic hand dermatitis which had worsened in the last 2 years. She was currently treated with Methotrexate and had previously been prescribed cyclopsorin. She had a personal history of eczema and hay fever and a family history of atopy. Her medical history included obstructive sleep apnoea, for which she used a continuous positive airway pressure (CPAP) mask. On examination, there was erythema with oedema, scaling and vesicles of both dorsal and ventral surfaces of her hands.

She had cleaned her CPAP mask daily with a liquid soap (CPAP wash) purchased from a medical supplies store for the last 2 years. There were no ingredients listed on the liquid soap container and we were unable to determine them on the first day of patch testing. She did not wear gloves when washing the mask. Furthermore, she made her own cleaning liquid, which she had used around the house for 5 years, comprising eucalyptus oil, dishwashing liquid and water (own cleaner). The ingredients of the dishwashing liquid were not available on the first day of patch testing. She would usually wear protective rubber gloves when cleaning with this mixture.

Patch testing to the Australian Baseline Series, a rubber series, eucalyptus oil and her own products, including the CPAP wash (1% aq.) and own cleaner (1% aq.) was undertaken. Testing was performed using allergEAZE skin patch test chambers and allergens were obtained from allergEAZE (Smart Practice, Canada) and Chemotechnique Diagnostics (Vellinge, Sweden), applied for 2 days. Patch test readings were made on day (D) 2 and D4 according to ICDRG guidelines. The results are shown in Table 1.

On day 2, information on the ingredients of both the CPAP wash and own cleaner was not yet available. After extensive enquiries of the manufacturer, it was found that this contained BIT. It was also found the liquid detergent used as an ingredient in her own cleaner contained BIT. Once this information was available, on day 4, BIT 0.05% pet., supplied by Chemotechnique Diagnostics , was applied as an additional patch test.

As the patient lived some distance from the patch testing centre, she took photos of her reaction to BIT on D2 and D4 , with a positive reading on D2 (+). On the basis of this, her history of a flare of her hand dermatitis in the last 2 years since being exposed to the CPAP wash, she was diagnosed with allergic contact dermatitis to BIT present in her CPAP wash and own cleaner, in addition to her pre-existing atopic hand eczema. Methylisothiazolinone, MCI and linalool were not found in the products she was currently using, and may have been of past relevance. The patient was counselled to avoid all of these allergens.

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Discussion:

Preservatives are required in water-based products, including personal and household products, to prevent contamination with microorganisms and to protect the consumer. Some members of the family of isothiazolinones include MI, MCI, octylisothiazolinone (OIT) and BIT.

There has been an epidemic of ACD caused by isothiazolinones, particularly MI and MI/MCI, over the last decade (1). International regulations from the EU stipulate that MI/MCI and MI are currently only allowed in rinse-off personal care (cosmetic) products (2), and that BIT and OIT are not allowed in personal care products (3,4). The allowed concentration of BIT in other products is, however, unregulated, and it has been found in relatively high concentrations (5). In this case, BIT was not labelled on her CPAP wash and the manufacturer needed to be contacted as there was no Material Safety Data Sheet available for the product. BIT is found in household cleaning products, water-based paints, polyvinyl chloride gloves, glue, and as an industrial biocide, and has been reported to cause ACD from all of these exposures (4, 6, 7).

In a recent study of 647 consecutively patch-tested patients, 1.4% had a positive reaction to BIT, and 56% of those were found to have BIT exposure (8). This is similar to the 1.6% of positive reactions to BIT found in the 7532 patch tested patients in another study (9). In older studies the sensitisation rates have been reported to be 0.8 – 1.2% (10, 11). BIT is not generally included in baseline series and is often found in products which may not be labelled appropriately, as in our case. It appears that there may be increasing use of BIT as an alternative to MI and that it is an emerging allergen.

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Table 1: Patch Test Readings and Relevance on Day 2 and Day 4

Allergen	Patch test reading D2	Patch test reading D4	Relevance
Methylisothiazolinone 0.2% aq.	+	+	Past
Methylisothiazolinone/ methylchloroisothiazolinone 0.02% aq.	+	+	Past
CPAP wash 1% aq.	+	+	Relevant
Hydroperoxides of linalool 1% pet.	?+	+	Unknown
Own cleaner 1% aq.	-	-	Relevant
Benzisothiazolinone 0.05% pet.	+		Relevant

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