Non-occupational allergic contact dermatitis from 2-N-octyl-4-isothiazolin-3-one in a Japanese mattress gel-sheet used for cooling

Case Reports

Case 1
A 31-year-old woman noticed a recurrent itchy erythema that affected her arms, abdomen, and face in the summer, 3 months after starting to use a Japanese mattress gel-sheet that cools the body, called Asa-made-cool® (which means ‘cool’ until the morning in Japanese). Because the rash was resistant to various treatments, she was hospitalized and her symptoms subsided following treatment with oral methylprednisolone. However, the rash flared up again the next summer in similar areas of her body. We noticed her habit of turning her face down when she slept and her rash was visible in regions which were in contact with the gel-sheet. Patch testing was performed with the gel-sheet. A patch test with the gel-sheet was strongly positive (++) at days (D) 2 and 4.

Case 2
A 41-year-old woman developed itchy oedematous erythema on the lateral sides of both her upper arms and lower legs in the summer, 1 month after she began to use a mattress gel-sheet that is

2-N-Octyl-4-isothiazolin-3-one (octylisothiazolinone) is a preservative that belongs to the isothiazolinone group. It is used in latex and oil-based paints, adhesives, wood preservatives, cutting oils for the preservation of leather, plastic manufacture, and in the textile industry. Although occupational allergic contact dermatitis from octylisothiazolinone has been reported (1–4), only one case of non-occupational allergic contact dermatitis from leather shoes containing octylisothiazolinone has been reported so far (2). Here, we report two cases of non-occupational allergic contact dermatitis from octylisothiazolinone used in a new Japanese product for mattresses.

Key words: allergic contact dermatitis; Japanese mattress gel-sheet; 2-N-octyl-4-isothiazolin-3-one; non-occupational; octylisothiazolinone; patch test.

Conflicts of interest: The authors have declared no conflicts.

Financial disclosure: None reported.

Author contributions: Dr Fukunaga had full access to all data in the study and takes responsibility for the integrity of those data and the accuracy of their analysis. Study concept and design: Fukunaga, Sasaki. Acquisition of data: Nishiyama, Fukunaga, Nagai, Shimizu. Analysis and interpretation of data: Fukunaga, Horikawa, Sasaki, Mori, Inoue. Drafting of the manuscript: Fukunaga, Horikawa, Nishigori. Administrative, technical, or material support: Fukunaga, Sasaki, Mori, Inoue. Study supervision: Horikawa, Sasaki, Nishigori.

Contact Dermatitis 2010: 62: 317–318
Atsushi Fukunaga1, Satoshi Nishiyama1, Hideki Shimizu1, Hiroshi Nagai1, Tatsuya Horikawa1, Ayumi Mori2, Noboru Inoue2, Kazumi Sasaki2 and Chikako Nishigori1
1Division of Dermatology, Department of Internal Related, Kobe University Graduate School of Medicine, 7-5-1 Kusunoki-cho, Chuo-ku, Kobe 650-0017, Japan and 2Product Safety Technology Center, National Institute of Technology and Evaluation, 4-1-67 Otemae, Chuo-ku, Osaka-shi, Osaka 540-0008, Japan
identical to the one described for Case 1. One week later, she stopped using the gel-sheet after a medical examination, and her symptoms gradually subsided. A patch test was performed with the gel-sheet, which showed a positive (+) reaction at D2 and D3.

According to the manufacturer, the gel-sheet contains a preservative, and a patch test with the preservative (0.1% pet.) was strongly positive (++) at D2 and D4. The gel-sheet contained octylisothiazolinone, 2-methyl-4-isothiazolin-3-one and carbendazim as preservatives. In both cases, patch testing showed strongly positive (++) reactions for octylisothiazolinone (0.1% pet.), and were negative for 2-methyl-4-isothiazolin-3-one (0.1% aq.) and carbendazim (1% pet.) at D2 and D4.

**Discussion**

Allergic contact dermatitis from octylisothiazolinone is rare, especially non-occupational cases (4). Only one previous report of contact dermatitis due to octylisothiazolinone in a mattress was reported and this was an occupational case (4). This Japanese mattress gel-sheet has a special structure, with three layers including a textile, polyethylene, and gel layer. According to the manufacturer’s information, only the gel layer of the gel-sheet should contain octylisothiazolinone, but we found that octylisothiazolinone had penetrated from the gel layer of the gel-sheets to the outer textile layer through the polyethylene layer in the gel-sheets, confirmed by gas chromatography/mass spectrometry. Therefore, these patients would have had contact with octylisothiazolinone for a long time every day and became sensitized to octylisothiazolinone. This new mattress product has been used to cool the body during the humid summer season in Japan. Because these patients were dressed only lightly in the summer, the large body area in contact with the new product could have made it easier to be sensitized to octylisothiazolinone.

In summary, octylisothiazolinone is a sensitizer that may induce prolonged dermatitis when it is in constant contact with the skin. Manufacturers should therefore pay attention to its unfavourable effects when they use octylisothiazolinone as preservatives, especially for products in contact with the skin surface.

**References**

1. Thormann J. Contact dermatitis to a new fungicide, 2-n-octyl-4-isothiazolin-3-one. *Contact Dermatitis* 1982: 8 (3): 204.

Address:
Dr Atsushi Fukunaga
Division of Dermatology
Department of Internal Medicine Related
Kobe University Graduate School of Medicine
7-5-1 Kusunoki-cho
Chuo-ku
Kobe 650-0017
Japan
Tel: +81 78 382 6134
Fax: +81 78 382 6149
e-mail: atsushi@med.kobe-u.ac.jp