

Allergic contact dermatitis to abietic acid derivatives in an over-the-counter hydrocolloid dressing

Reina Omura¹  | Junko Sowa-Osako¹ | Chiharu Tateishi¹ | Ayaka Okazaki¹ | Kazuyoshi Fukai^{1,2}  | Tsuyoshi Kawakami³ | Maiko Tahara³ | Daisuke Tsuruta¹

¹Department of Dermatology, Osaka City University Graduate School of Medicine, Osaka, Japan

²Department of Dermatology, Osaka City General Hospital, Osaka, Japan

³Division of Environmental Chemistry, National Institute of Health Sciences, Osaka, Japan

Correspondence

Reina Omura, Department of Dermatology, Osaka City University Graduate School of Medicine, 1-4-3 Asahimachi, Abeno-ku, Osaka 545-8585, Japan.
Email: reinaria0927@gmail.com

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Colophonium (rosin) is a natural resin derived from pine. It contains numerous chemical compounds, mostly abietic acid and its derivatives.^{1,2}

CASE REPORT

A 13-year-old girl sustained a skin laceration on the left lower leg. She applied an over-the-counter (OTC) hydrocolloid dressing ("Dressing A"). The next day, she replaced "Dressing A" with another OTC hydrocolloid dressing ("Dressing B"). One day later, severe pruritus developed, prompting her to remove "Dressing B." She visited a local dermatologist and was then referred to us.

Physical examination revealed rectangular infiltrated erythema with a central laceration on the left lower leg (Figure 1). The eruption was associated with itching, a sensation of localized heat, and pain. Thus, we performed a closed patch test with "Dressing A", "Dressing B", (both "as is"), and "TRUE Test". Positive reactions were noted to "Dressing A" on day (D)2, D3, and D7, and to colophonium on D7. In contrast, "Dressing B" remained negative.

To further characterize the causative chemical compounds, qualitative analysis of abietic acid and related compounds in "Dressing A", "Dressing B", and the colophonium patch test preparation were conducted. The sample was extracted with ethanol, and this solution was fractionated using a silica gel column. The sample solutions were analyzed by gas chromatography-mass spectrometry after derivatization with *N,O*-bis(trimethylsilyl)tri-fluoroacetamide. In "Dressing A", dehydroabietic acid, dihydroabietic acid, and methyl dehydroabietate were detected. In the colophonium patch test preparation, dehydroabietic acid, abietic acid, and palustric acid were found (Figure 2). In contrast, in "Dressing B," no abietic acid nor abietic acid-related compounds were detected.

DISCUSSION

"Dressing A" and the colophonium patch test preparation contained a common chemical: dehydroabietic acid. As the structural formula of dehydroabietic acid resembles that of other abietic acid derivatives (Figure 2), cross-reactivity of abietic acid-related compounds is likely. We diagnosed this case as allergic contact dermatitis to abietic acid derivatives, which are dehydroabietic acid, dihydroabietic acid, and/



FIGURE 1 Laceration on the left lower leg with surrounding rectangular erythema matching the size of "Dressing A" and "Dressing B"

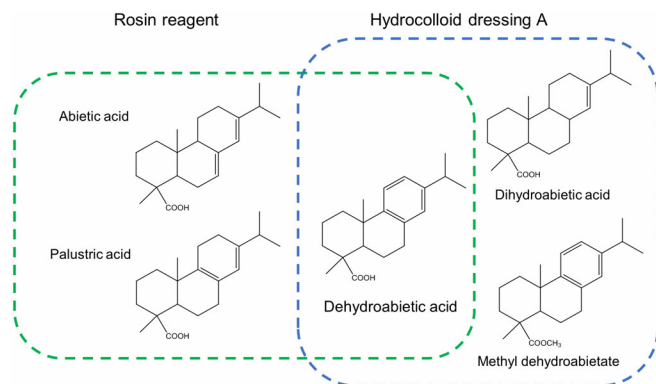


FIGURE 2 Dehydroabietic acid, dihydroabietic acid, and methyl dehydroabietate were detected in "Dressing A". Dehydroabietic acid, abietic acid, and palustric acid were detected in the colophonium patch test preparation

or methyl dehydroabietic acid found in the hydrocolloid dressing, "Dressing A".

Previous reports of contact dermatitis to hydrocolloid dressing were caused by chemically modified colophonium, including as pentaerythritol ester of hydrogenated colophonium and ester of hydrogenated colophonium.^{1,3-5} Because hydrocolloid dressings are generally occlusively applied to eroded or ulcerated skin, the chemicals will penetrate more easily into the skin and may cause contact allergy, as in this case.

CONFLICTS OF INTEREST

The authors declare no conflicts of interest.

ORCID

Reina Omura  <https://orcid.org/0000-0001-5961-9818>

Kazuyoshi Fukai  <https://orcid.org/0000-0002-9807-1397>

REFERENCES

1. Pereira TM, Flour M, Goossens A. Allergic contact dermatitis from modified colophonium in wound dressing. *Contact Dermatitis*. 2007;56(1): 5-9.
2. Karlberg A-T. Methyl esterification of 15-hydroperoxyabietic acid does not affect the patch-test result in colophonium allergic patients. *Contact Dermatitis*. 2007;56(6): 355-356.
3. Timmer-de Mik L, Toonsta J. Allergy to hydrocolloid dressings. *Contact Dermatitis*. 2008;58(2): 124-125.
4. Down AM, Sharp LA, Sansom JE. Pentaerythritol-esterified gum rosin as a sensitizer in Granuflex[®] hydrocolloid dressing. *Contact Dermatitis*. 1999;41(3): 162-163.
5. Mallon E, Powell SM. Allergic contact dermatitis from Granuflex hydrocolloid dressing. *Contact Dermatitis*. 1994;30(2): 110-111.

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