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A case of allergic contact dermatitis caused by arbutin

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doi:10.1111/cod.12375

Key words: allergic contact dermatitis; arbutin; CAS no. 497-76-7; cosmetics; patch testing; skin-whitening.

Arbutin is one of several well-known skin-whitening agents. It has an inhibitory effect on melanin synthesis (1), and is thus included in various skin-whitening cosmetics. Allergic contact dermatitis caused by arbutin has been reported only rarely, and only from Japan (2, 3). Here, we describe a case of allergic contact dermatitis caused by arbutin.

Case Report

A 61-year-old woman presented with a 9-month history of pruritic erythema on her cheeks and upper eyelids. She had used many cosmetics during this period. We suspected allergic contact dermatitis caused by cosmetics. Patch testing was performed with the Japanese baseline series and the patient's cosmetics. Patch test units were applied on her back with Patch Tester Torii® (Torii Pharmaceutical®, Tokyo, Japan), and left occluded for 2 days. Readings were performed on days 2, 3 and 7 in accordance with ICDRG criteria; the results are summarized in Table 1. A whitening lotion ('as is', Ayaka Whitening Lotion N®, Chifure Corporation®, Saitama, Japan), which the patient had been using for more than a year, elicited a positive reaction. Additional patch testing was performed with all 18 ingredients of the whitening lotion, and only arbutin (5% pet.) elicited a positive reaction (Fig. 1). After the patient had stopped using the whitening lotion, her facial erythema resolved, thus allowing a diagnosis of allergic contact dermatitis caused by arbutin in the whitening lotion.

Table 1. Results of patch testing

Allergens	Results		
	Day 2	Day 3	Day 7
Japanese baseline allergens			
Cobalt chloride 1% pet.	+	+	–
Gold sodium thiosulfate 0.5% pet.	+	+	+
<i>p</i> -Phenylenediamine 1% pet.	–	–	–
Fragrance mix 8% pet.	–	–	–
Paraben mix 15% pet.	–	–	–
Lanolin alcohols 30% pet.	–	–	–
Methylchloroisothiazolinone / methylisothiazolinone 0.01% aq.	–	–	–
Cosmetics that the patient had been using			
Whitening lotion 'as is'	+	+	+
Out of 18 ingredients in the whitening lotion			
Arbutin 5% pet.	+	+	+



Fig. 1. Positive patch test reaction to arbutin.

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Conflict of interests: The authors declare that no potential conflicts exist. Each author has contributed and participated sufficiently to take public responsibility for appropriate portions of the work.

Discussion

Arbutin (CAS no. 497-76-7; 4-hydroxyphenyl- β -D-glucopyranoside) is a naturally occurring glucoside of hydroquinone (4), and the major mechanism responsible for its inhibitory effect on melanin synthesis is thought to be inhibition of tyrosinase activity (1). According to the group study of the Japanese Society for Contact Dermatitis in 2003, the optimum concentration of arbutin for patch testing is considered to be 5.0% pet. (3). Previously, only four cases of allergic contact dermatitis caused by arbutin, including the present case, have been reported, and all cases were from Japan (2, 3).

The chemical structure of arbutin is similar to that of hydroquinone and *p*-phenylenediamine (PPD), so allergic cross-reactions among them have been suggested (2). Our patient showed a negative reaction to PPD; hydroquinone was not tested. From these results, we consider it likely that our patient became sensitized to arbutin by using the whitening lotion containing it.

Recently, there has been great interest in skin-whitening agents in Japan, and the frequency of use of skin-whitening cosmetics, including arbutin, may increase. Therefore, attention should be drawn to the possibility of arbutin-induced contact dermatitis.

References

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