

CONTACT POINTS

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Allergic contact dermatitis due to cosmetics containing vitamin K1 oxide

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Vitamin K denotes a group of molecules that are needed for the synthesis of certain proteins, mostly required for blood coagulation. Five isoforms of vitamin K exists: vitamin K1, K2, K3, K4, and K5. Vitamin K1 (phytonadione, CAS number 84-80-0/81818-54-4) has been widely used in cosmetics as it is claimed to reduce the purpura and hyperpigmentation associated with surgical and laser therapies (1). Recently, as a result of its sensitizing potential (2), this substance has been forbidden in the EU as an ingredient of cosmetics. However, there is no restriction on the use of the oxidized-isoform of vitamin K1, vitamin K1 oxide (phytonadione epoxide, CAS number 25486-55-9) and it remains in use in cosmetics in Europe.

In this study, we report three cases of allergic contact dermatitis from vitamin K1 oxide.

Case Report

Case 1

A 47-year-old woman developed eczematous lesions on her legs after

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Fig. 1. (a) Erythematous pruritic lesions on both legs. (b) Note the perifollicular distribution.

the use of Auriderm XO[®] (Auriga International[®] S.A. Braine-l'Alleud, Belgium). This cosmetic was prescribed to prevent hyperpigmentation after the treatment of varicose veins with pulsed laser therapy. Examination showed slightly rounded perifollicular papules distributed over the anterior surface of both legs (Fig. 1). Topical corticosteroids were prescribed but they were ineffective. The patient

finally improved with a short course of oral corticosteroids.

Case 2

A 63-year-old woman, with previous history of breast cancer treated with breast-conserving surgery and radiotherapy, presented with pruritic lesions on the right breast (Fig. 2).



Fig. 2. Eczematous lesions on the right breast after the use of Auriderm XO[®] to treat post-radiotherapy telangiectasia.



Fig. 3. Positive patch-test reaction to Auriderm XO® in case 3.

She related the symptoms to the use of Auriderm XO® prescribed to treat post-radiotherapy telangiectasia. When she stopped using this product, her dermatitis settled.

Case 3

A 51-year-old woman presented with pruritic lesions of 4-month duration affecting her legs. She had been applying Auriderm XO® for 1 month after surgical treatment of varicose veins. When she stopped using the cream, she noticed minimal improvement but the lesions did persist. Examination showed erythematous perifollicular papules distributed all over her legs. Topical corticosteroids were prescribed and the lesions cleared completely after 1 month.

Three patients were patch tested according to International Contact Dermatitis Research Group (ICDRG) criteria, using van der Bend® patch-test chambers (Van der Bend, Brielle, the Netherlands) applied on the back with Micropore™ (3M Health Care, Borken, Germany), and fixed with Mefix® (Mölnlycke Health Care, Göteborg, Sweden) as adhesive tape. The European baseline series, Auriderm KO® 'as is', and the vehicle components of Auriderm XO, provided by the company were tested, except for Vitamin K1 oxide 1% pet. which was only tested in patients 1 and 2 because the quantity received in Leuven from the company for the third patient was insufficient. However, she did react to the cream as such (Fig. 3). The patch-test results are shown in Table 1.

Discussion

Cutaneous reactions to vitamin K can be classified into three groups: (i) anaphylaxis due to intravenous administration, (ii) local reactions at injection sites in parenteral use, both well-known adverse effects (3), and (iii) contact dermatitis. Occupational allergic contact dermatitis from vitamin K was first described in employees in veterinary and pharmaceutical laboratories, who were all patch test positive to vitamin K3 (4–6). In our contact-allergy unit, two occupational cases due to animal feed in cattle-holders have been observed, both characterised by an airborne distribution of their lesions.

Veneziano et al. reported the first non-occupational case of allergic contact dermatitis due to vitamin K1 contained in cosmetics (7). Since then, other cases have been published (8–10). We observed two cases in Leuven, who could only be tested to the Auriderm cream containing vitamin K1 to which they reacted, but who did react positively to vitamin K3 as well. Between December 2003 and February 2006, the French Group REVIDAL-GERDA (11) reported 12 cases, 6 of whom required hospitalization. As a result of this, in March

2006 the AFFSAPS banned vitamin K1 for its use in cosmetics (12). In November 2009, the chemical was banned throughout the EU (2).

Vitamin K1 oxide, the oxidized-isoform of vitamin K1, is claimed to be as effective as the non-oxidized form to treat post-procedural purpura after laser therapies (13). For this reason, cosmetics containing vitamin K1 oxide have replaced those containing the non-oxidized form. Furthermore, they are recommended in clinical practice by ophthalmologists, plastic surgeons, and advised by beauticians. As far as we are aware, we report the first three cases of allergic contact dermatitis due to vitamin K1 oxide contained in cosmetics.

Further research will be necessary to understand the immunological mechanism of vitamin K sensitization. Cross-reactions between vitamin K1 and K4 (14) and vitamin K3 (as in our cases) and K4 have been described (15). Moreover, vitamin K1 can also elicit an immediate hypersensitivity reaction after cutaneous sensitization (16).

We consider that the use of vitamin K1 oxide in cosmetics may lead to unnecessary sensitization in patients, who may then be denied vitamin K-containing therapies for treatment of important systemic diseases. Vitamin K is widely used in medicine and new significance therapeutic indications are being studied (17–19).

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Table 1. Patch-test results at D4

	Auriderm XO 'as is'	Vit. K1 oxide 1% pet.	Rest of the ingredients
Patient 1	++	++	–
Patient 2	++	++	–
Patient 3	+	Not tested	–

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