

Contact Allergy from Vitamins in Cosmetic Products

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We report three new cases of allergic contact dermatitis due to vitamins in cosmetic creams. The first patient was diagnosed with worsening rosacea but had allergic contact dermatitis from α -tocopherol in a moisturizing cream. The second and third cases presented as acute eyelid dermatitis due to vitamin K in eyelid lifter creams. Repeated open application testing and patch tests with the actual products and individual components of the creams were useful in establishing the diagnosis.

THE NUMBER OF COSMETIC PRODUCTS that include vitamins as an ingredient has increased over the last few years since vitamins are considered natural components that improve the appearance and health of the skin.

Contact allergic reactions from cosmetics are common in Europe and the United States due to an increasing use of these products in personal care. Fragrances and preservatives are classically considered the most common cosmetic allergens; nevertheless, relevance is seldom proven against the former. Furthermore, the sensitivity rate of the ingredients in cosmetics is changing because the composition of these products varies with time.^{1,2}

The diagnosis of cosmetic allergy can be overlooked because irritative dermatitis is the most common side effect of cosmetics.³ Therefore, it should be confirmed with repeat open application tests (ROATs) and patch tests with individual components and the products "as is."⁴

found on her face, mainly on the forehead and cheeks (Fig 1). A mild desquamation could also be observed. She denied having applied other cosmetic products. An allergic contact dermatitis in relation to this cream was suspected, and patch tests were performed with the standard series of the Spanish Contact Dermatitis Research Group (GEIDC), a vehicles and emulsifiers series, and the moisturizing cream "as is." A positive reaction (++) to the latter was seen at 48 hours, 96 hours, and 7 days after testing. When patch tests were performed with 22 components of the cream (provided by the manufacturers), a positive reaction to α -tocopherol at 0.5% in petrolatum was observed. ROAT performed with the cream on the left forearm yielded a positive result after 96 hours. Results of patch tests with α -tocopherol at 0.5% in petrolatum were negative in 10 controls. After she stopped the application of this cream, the lesions improved substantially, and no recurrence was observed.

Case Reports

Case 1

An otherwise healthy woman consulted for worsening of rosacea accompanied by pruritus and desquamation on her face and neck after applying a moisturizing cream (Eucerin Sensitive Facial Skin Hydroprotec SPF 15, Beiersdorf, Argentona, Spain). On physical examination, numerous rounded small erythematous papules and pustules were



Figure 1. Facial lesions in Case 1 after the application of a cream containing vitamin E.

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Case 2

A 55-year-old woman with a 35-year history of psoriasis presented with eczematous dermatitis localized on periorbital and zygomatic regions. She had been treated with topical hydrocortisone and oral antihistamines, with improvement of her lesions. The patient related her symptoms to the local application of an eyelid lifter cream (Ureadin Facial eye contourR, Isdin, Barcelona, Spain). Patch tests were performed with the GEIDC standard series, a vehicles and emulsifiers series, a cosmetics series (Chemotechnique Diagnostics AB, Malmo, Sweden), and the cream “as is.” Positive reactions to the cream and nickel were observed at 48 hours (+) and 96 hours (++) (Fig 2). The result of ROAT with the product “as is” applied on the left forearm was positive after 48 and 96 hours. Patch testing with 30 components of the cream, sent us by the manufacturer, showed a positive reaction to phytomenadione at 1% in petrolatum (pet) at 48 and 96 hours.

The concentration of the cream’s components was not known, so patch testing with Konakion MM (Roche, Switzerland) (0.1 mL) was performed. An intense positive reaction was seen at 72 hours. Konakion MM is one of the marketed preparations of vitamin K; each ampoule contains 10 mg of phytomenadione in 1 mL of colloidal aqueous solution.

Results of tests with vitamin K₁ (1–10% pet) and Konakion MM (0.1 mL) in 20 controls were negative.



Figure 2. Patch test showing a positive reaction to a suspicious product in Case 2.

Case 3

An otherwise healthy 28-year-old woman presented with an acute eczema affecting the lower eyelids that had been treated with oral and topical corticosteroids. The patient had applied Auriderm K5 cream (AG Farma SA, Madrid, Spain) on the eyelids for some weeks before the onset of cutaneous lesions.

She was patch-tested with the GEIDC standard series, a vehicles and emulsifiers series, a cosmetics series (Chemotechnique), and the suspicious cream “as is.” Readings made at 48 and 96 hours showed a positive reaction (++) to Auriderm K5 cream after 96 hours. The result of a ROAT performed on the left forearm with this cream was positive after 72 hours.

Individual components were not provided by the manufacturer, so patch testing was performed with phytomenadione (1% pet), Konakion MM (0.1 mL), and α -tocopherol (0.5% pet). Positive reactions were obtained with phytomenadione and Konakion MM after 48 and 96 hours. Results of tests with vitamin K₁ (1–10% pet) and Konakion MM (0.1 mL) were negative in 20 controls.

Discussion

Vitamin E (α -tocopherol) is a natural or synthetic component with supposed antioxidant and anti-aging properties. It can be found naturally in many substances, such as barley, rice, corn, rapeseed, alfalfa, wheat, eggs, meat, and fish.^{5,6} It is contained in many cosmetic products (including moisturizing creams, deodorants, soaps, and creams for scars, burns, and striae)^{4,6} and used to be named on the packages because of its beneficial properties. In spite of its wide use, hypersensitivity to vitamin E is scarcely reported,^{5–8} perhaps because of the low concentrations used in these preparations.^{6,7} Some of these beauty products associate vitamins A and E because it is thought that vitamin E enhances the action of vitamin A. Therefore, contact allergy reactions to both ingredients are possible.⁹

Localized and generalized eczema, urticarial contact dermatitis, and erythema multiforme-like eruptions are different models of allergic cutaneous manifestations that have been noticed in relation to α -tocopherol.^{5–7} These skin reactions were reported after topical application of vitamin E; however, adverse effects after the oral administration of this substance were not noticed. Therefore, cutaneous hypersensitivity was suggested as the causative mechanism.⁵ Patch tests are useful for making the diagnosis of contact dermatitis from α -tocopherol. The

concentration recommended in these cases is 5 to 20% pet; in generalized lesions, however, a lower concentration such as 0.25%, 0.50%, or 1% pet might be sufficient.^{7,8}

Vitamin K is important for the endogenous synthesis of prothrombin and coagulant factors VII, IX, and X. At least four forms of vitamin K exist: phytomenadione (vitamin K₁), menaquinone (vitamin K₂), menadione (vitamin K₃), and menadiol (vitamin K₄). The two first types are natural forms whereas vitamins K₃ and K₄ are synthetic analogues.¹⁰

Vitamin K is present in green vegetables and liver; the daily requirements are unknown. Topical vitamin K is used before and after a variety of procedures, such as cosmetic surgery, liposuction, sclerotherapy, carbon dioxide procedures, and pulsed dye laser. It is also contained in products for hyperpigmentation and in eyelid lifter creams.¹¹

Cutaneous adverse effects are rarely reported^{11–15} although they might be underdiagnosed because different clinical presentations are possible.¹³ Dermatitis is more common with lipid soluble forms such as phytomenadione¹⁴ because percutaneous absorption is greater. Cutaneous hypersensitivity reactions to vitamin K₁ after subcutaneous or intramuscular injection^{10,14} and irritant contact dermatitis from vitamin K₃ have been reported.¹⁵ However, allergic dermatitis from topical cosmetic use of vitamin K is scarcely described, and only four cases have been reported to date in the medical literature.^{11–13} Patch testing with vitamin K is useful for making the diagnosis; 0.1% pet is the recommended concentration¹⁵ although higher concentrations have been used.^{10,11,16}

The reason that skin hypersensitivity to these substances is becoming more and more frequent is yet to be determined. It might have to do with the concentrations used in cosmetics and their combination with other components (such as urea or retinol, which are well-known irritants) that might foster the development of skin reactions. It would be interesting if manufacturers specified the concentration of the components on the information leaflet of the creams and if they avoided the combination of irritant substances, as previously mentioned.

The body site where cosmetic products are applied might also play a role. Thus, particular locations with greater absorption (such as the eyelids) or where there may be prolonged skin contact (such as the axillae) could be prone to develop hypersensitivity.

Little has been written about the association of topical vitamins with contact dermatitis, but due to a more frequent use of these substances, dermatologists and allergologists should always consider this possibility when evaluating the role of cosmetics as inductors of cutaneous lesions.

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