

Polidocanol: a potential contact allergen in shampoo

Contact Dermatitis 2007; 56: 178

Claire E. Grills and Susan M. Cooper

Department of Dermatology, Churchill Hospital, Oxford, UK

Key words: laureth 9; polidocanol; shampoo.

Case Report

A 48-year-old atopic female underwent investigation following a significant scalp reaction attributed to hair dye. In the past, the patient had dyed her hair with no adverse effects; however, 48 hr after using a hair dye, she developed eczema of her scalp, face and neck, which subsequently spread to the rest of her body. The rash required oral prednisolone. A subsequent attempt at dying hair with a short contact treatment only resulted in a milder form of the same eczematous rash. The eczema on the forearms persisted. The patient opted to use E45 Dry Scalp Shampoo (Crookes healthcare) Crookes healthcare (Nottingham, Nottinghamshire, UK) as a milder alternative to regular shampoo. Less than 12 hr after using the shampoo, the patient developed an eczematous eruption over the scalp and extending down the neck to the abdomen.

She was patch tested with the British Contact Dermatology Society (BCDS) standard, hairdressing, cosmetic and medicament series and personal products, which included perfume and E45 dry scalp shampoo. The E45 shampoo was diluted 1:10. Positive reactions (Table 1) to para-phenylenediamine (PPD) and 4-aminophenol were noted at D2 and D4. A reaction to E45 shampoo was observed on D2.

PPD, the most common active ingredient in hair dyes, was presumed to be the triggering allergen for the initial eczematous rash this patient experienced following dying her hair. 4-aminophenol is a component of hair dye and cross-reacts with PPD. The individual constituents of E45 shampoo were kindly supplied by the manufacturers and tested in a similar method. The patient reacted to polidocanol 3% in white petrolatum on D4. Interestingly, the patient also had a positive reaction to Laureth 2 at D2 and D4.

Discussion

Polidocanol (CAS 9002-92), also known as Laureth 9, is an addition polymer of lauryl alcohol and an average of 9 units of ethylene oxide (1). It is soluble in lipids and water and thus widely used as an emulsifier and surfactant in cosmetics and cleaning products, such as E45 shampoo. It is also used as a topical anaesthetic and antipruritic and injected as a varicose vein sclerosant.

Laureth 2 (CAS 3055-95-6) is an emulsifier, cleaner and dispersant for cosmetics, creams and milky lotions. It is also an addition polymer of lauryl alcohol but has an average of 2 units of ethylene oxide. As it is chemically related to polidocanol, cross-reactivity can be expected.

Table 1. Patch test results

Test substance	D2	D4
p-Phenylenediamine	+	++
4-Aminophenol	–	+
E45 Dry scalp shampoo components		
Dexpantenol 5%	–	–
Polidocanol 3%	–	+
Climbazol 1%	–	–
Polyquaternium-10	–	–
Kaliumsorbat 5%	–	–
Laureth 2	+	+

–, negative; +, positive; ++, strongly positive.

A number of reports have recently highlighted the relevance of polidocanol as a contact allergen. One report from Germany, detailing 16 patients with positive patch test reactions to polidocanol, found the majority of patients suffered from contact dermatitis and had further contact sensitizations to antibiotics and to vehicle constituents used to treat this dermatitis (2). Similarly, our patient used E45 Dry Scalp shampoo, containing polidocanol, as part of the treatment of contact dermatitis of the scalp secondary to PPD. As an emulsifier and a surfactant, polidocanol can be found in a number of products used to treat dermatitis. This was highlighted in a case report which detailed worsening of a work-related hand eczema in a non-atopic individual due to a polidocanol-containing emollient used to treat the condition (1).

A further study of 8739 patients which patch tested patients to polidocanol of differing concentrations suggested that elderly patients with lower leg dermatitis were particularly at risk of contact allergy to this product (3).

Our patient, together with previous studies, highlight polidocanol as a potential contact allergen. As far as we are aware, this is the first reported case of contact allergy to polidocanol in a shampoo. A history of the use of polidocanol-containing substances should be sought in patients with chronic dermatitis and testing with formal patch testing performed. We highlight polidocanol as a potential contact allergen in shampoo.

References

1. Gallo R, Basso M, Voltolini S, Guarnera M. Allergic contact dermatitis from laureth-9 and polyquaternium-7 in a skin care product. *Contact Dermatitis* 2001; 45: 356–357.
2. Frosch PJ, Schulze-Dirks A. Contact allergy caused by polidocanol. *Hautarzt* 1989; 40: 146–149.
3. Uter W, Geier J, Fuchs T. Contact allergy to polidocanol, 1992 to 1999. *J Allergy Clin Immunol* 2000; 106: 1203–1204.

Address:

C. E. Grills

Department of Dermatology

Churchill Hospital

Oxford, UK

e-mail: nandegrills@optusnet.com.au