Table 1. Patch test reactions in areas pretreated with CsA in various vehicles and desoximethasone, in 10 female patients with proven allergic contact dermatitis

Patient no.	Allergen	CsA 10% Azone®	CsA 10% Labrafil®	CsA 10% DMSO	Desoxymethasone 1% emulsion	Negative control
1	nickel	++	++	++	negative	++
2	nickel	++	++	++	negative	++
3	DDM	+++	+++	+++	+?	+++
4	nickel	++	++	++	negative	++
5	PPD	++	++	++	negative	++
6	nickel	+++	+++	+++	negative	+++
7	nickel	++	++	++	+?	++
8	nickel	++	++	++	negative	++
9	nickel	++	++	++	negative	++
10	nickel	++	++	++	negative	++

Nickel = nickel sulphate 5% pet. DDM = diaminodiphenylmethane 1% pet. PPD = p-phenylendiamine base 1% pet.

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Allergic contact dermatitis from minoxidil

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Key words: allergic contact dermatitis; minoxidil; propylene glycol; medicaments; patch testing technique.

In the recent Wilson et al. (1) study of patients treated with topical minoxidil for androgenetic alopecia, more than 10% of patients experienced contact dermatitis. In 1985, De Greef et al. (2) reported the first case of allergic contact dermatitis from minoxidil itself and propylene glycol in the vehicle. Since then, around 30 cases of allergic contact dermatitis from minoxidil and/or propylene glycol have been reported (1, 3–7).

Case Reports

In the last 2 years, we have seen 1 male and 7 female patients, aged from 24 to 41 years (mean 33 years), with pruriginous erythema, papules and scaling of the scalp and forehead. In 2 patients, there were also vesicular lesions extending to the auricular area, retroauricular folds and neck. All 8 patients had been using minoxidil solution for the treatment of androgenetic alopecia, for periods of 3 weeks to 1 year.

Patients were patch tested with the European standard series (Trolab): the topical minoxidil solution used, minoxidil 2% in 20% propylene glycol, 0.5% in 5% propylene glycol, and 2% pet.; and propylene glycol 10% and 20% aq. (Upjohn). 5 patients were also tested with minoxidil (Loniten®) 1 and 2% in ethanol. Results are shown in Table 1. 25 controls were tested with minoxidil 2% in 20% propylene glycol: only 2 patients, both allergic to propylene glycol, had positive reactions.

Table 1. Patch test results

	Case no.							
	1	2	3	4	5	6	7	8
standard series	–	+*	–	–	–	–	–	–
minoxidil topical solution	+++	+++	+++	++	+++	+++	+++	+++
minoxidil 2%[a]	+++	+++	+++	+++	+++	+++	+++	+++
minoxidil 0.5%[b]	+++	+++	++	–	++	++	+	+++
minoxidil 2% pet.	++	++	–	++	–	–	–	–
minoxidil[a] 2% eth.	++	+++	+++	NT	–	–	NT	–
minoxidil[c] 1% eth.	++	++	+	NT	–	–	NT	–
placebo sol. minoxidil	–	+++	?+	–	–	–	–	–
propylene glycol 10%	–	+++	–	–	–	–	–	–

* Positive reactions to nickel, balsam of Peru and fragrance-mix.
[a] Vehicle: propylene glycol 20%, ethanol 95°, 63% and water. [b] Vehicle: propylene glycol 5%, ethanol 95°, 79% and water. [c] Minoxidil in Loniten® tablets.

Discussion

All 8 patients had allergic contact dermatitis from topical minoxidil solution. This was due to minoxidil alone in 7 cases and simultaneous allergy to minoxidil and propylene glycol in the other.

The vehicle is important when patch testing minoxidil. All our patients reacted to the topical minoxidil solution used and to minoxidil 2% in propylene glycol and water. Tests with minoxidil in pet. or in ethanol were negative in 5/8 and 3/6 patients, respectively, in agreement with previous results (1, 3, 6).

Like Wilson et al. (1), we believe that propylene glycol, which enhances the skin penetration of many substances (8), including minoxidil, is necessary, both for the trichotrophic effects of minoxidil and for its skin penetration, to elicit contact sensitivity.

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