

Patch Testing in Allergic Contact Dermatitis from Minoxidil

Monica Corazza, Alessandro Borghi, Michela Ricci, Oriele Sarno, and Annarosa Virgili

Précis

When allergic contact dermatitis due to a topical minoxidil preparation is suspected, the correct selection of both vehicle and concentration for patch-testing the active ingredient is essential.

Discussion

A 60-year-old woman presented with itchy, eczematous, and moderately exudative lesions on the scalp after 4 months' use of a galenic lotion of minoxidil 5% (minoxidil 5%, propylene glycol 15%, and a mixture of ethylic alcohol and water (70/30) 80%) for the treatment of androgenetic alopecia.

Results of patch tests with the Italian baseline series of contact allergens (Società Italiana di Dermatologia Allergologica Professionale e Ambientale) were negative, whereas after 6 days, a repeated open application test (performed by applying the galenic minoxidil 5% lotion to the anterior surface of the arm) induced a positive reaction, which became more evident in the following 3 days. Further patch tests were carried out with the galenic minoxidil 5% preparation "as is" and with pure minoxidil powder at various concentrations and diluted in different solvents. The patch-test results are shown in Table 1. Due to these results, the patient was no longer a candidate for using topical minoxidil solution to treat androgenetic alopecia.

Since 1984, numerous cases of allergic contact dermatitis from minoxidil solution have been reported.¹⁻³ Excipients (mainly propylene glycol) are the agents that are more frequently responsible for allergic contact dermatitis from minoxidil solution.⁴ Although sensitization to the active principle minoxidil seems to be less

PEARLS provide insight into understanding disease pathogenesis or improving treatment. ZEBRAS inform about previously unrecognized conditions or atypical variants of known disorders.

SECTION EDITORS:

Douglas L. Powell, MD

Department of Dermatology
University of Utah
Room 4B454 SOM
30 North 1900 East
Salt Lake City, UT 84132
Tel: 801-581-6465
E-mail: Doug.Powell@derm.med.utah.edu

Matthew J. Zirwas, MD

Division of Dermatology
Department of Medicine
Ohio State University
OSU Dermatology-East
5965 East Broad Street, Suite 290
Columbus, OH 43213
Tel: 614-864-8302
E-mail: matt.zirwas@osumc.edu

common, such sensitization precludes any further treatments with preparations containing minoxidil. Thus, patients suspected of suffering from allergic contact dermatitis from minoxidil solution should be patch-tested to determine whether the causative allergen is the active ingredient itself or a solvent.

It is notable that in the case reported here, contact allergy to the therapeutic formulation in use (containing propylene glycol and ethanol) and to minoxidil in alcohol was confirmed, whereas only a weak reaction to minoxidil in petrolatum was elicited. This finding was previously described as indicating a vehicle-dependent allergic contact dermatitis, presumably attributable to variation in the skin delivery of allergens in different vehicles.⁵ Propylene glycol and alcohol seem to enhance transcutaneous minoxidil penetration more than petrolatum does. In the case described, patch testing elicited a positive allergic reaction to minoxidil 5% in alcohol whereas the reaction to a 1% concentration was negative. This suggests that the concentration of minoxidil in tissue might not reach the elicitation threshold when the active ingredient is tested at

From the Department of Clinical and Experimental Medicine, Section of Dermatology, University of Ferrara, Ferrara, Italy.

Address reprint requests to Dr. Monica Corazza, Department of Clinical and Experimental Medicine, Section of Dermatology, University of Ferrara, Via Savonarola 9, 44100 Ferrara, Italy. E-mail: czm@unife.it

DOI 10.2310/6620.2010.10026

© 2010 American Contact Dermatitis Society. All Rights Reserved.

DECKER



Table 1. Patch-Test Results

<i>Substance</i>	<i>Reaction at 48 Hours</i>	<i>Reaction at 72 Hours</i>
Minoxidil 5% galenic lotion “as is”	—	+++
Minoxidil 5% pet	—	+
Minoxidil 1% eth	—	—
Minoxidil 5% eth	—	++
Propylene glycol 5% pet	—	—
Ethanol	—	—

eth = in ethanol; pet = in petrolatum.

1% in alcohol. Therefore, sensitivity to minoxidil may not be diagnosed if patch tests are prepared in petrolatum or at a 1% concentration in alcohol.

In our case, finding positive reactions to minoxidil both in the therapeutic formulation used by the patient and in alcohol allowed us to exclude a compound allergy.⁵ The absence of a reaction to propylene glycol led us to exclude sensitization to this solvent as well, corroborating the diagnosis of a true allergic contact dermatitis from minoxidil.

In conclusion, on the basis of both the literature and our experience, first-line patch testing should include

challenges with the minoxidil preparation as is, minoxidil in propylene glycol (if the therapeutic preparation does not contain propylene glycol), minoxidil 5% in ethanol, propylene glycol, and ethanol.

Pearl

This case provides indications regarding more-appropriate patch testing with minoxidil to properly evaluate suspected allergic contact dermatitis from topical minoxidil preparations.

References

1. van der Willigen AH, Dutrée-Meulenberg ROG, Stolz E, et al. Topical minoxidil sensitization in androgenic alopecia. *Contact Dermatitis* 1987;17:44–5.
2. Ruas E, Goncalo M, Figueiredo A, et al. Allergic contact dermatitis from minoxidil. *Contact Dermatitis* 1992;26:57–8.
3. Ebner H, Muller E. Allergic contact dermatitis from minoxidil. *Contact Dermatitis* 1995;32:316–7.
4. Friedman ES, Friedman PM, Cohen DE, et al. Allergic contact dermatitis to topical minoxidil solution: etiology and treatment. *J Am Acad Dermatol* 2002;46:309–11.
5. Withmore SE. The importance of proper vehicle selection in the detection of minoxidil sensitivity. *Arch Dermatol* 1992;128:653–6.