

SKIN FOCUS

ACUTE INFLAMMATION OF THE SCALP AND HAIRLINE

I Browne, MB ChB

Department of Dermatology, Grootte Schuur Hospital, Observatory, Cape Town, South Africa

Reactions to hair dye can cause severe contact dermatitis. Presenting signs may range from mild to severe eczema to contact urticaria, or rarely anaphylaxis.

Case report

A 33-year-old domestic worker gave a history of having applied black hair dye to her scalp (Fig. 1). One week later she noticed prickling and swelling of both eyes. The next day her face and lips were swollen and the hairline and scalp were very itchy. Progressive scalp involvement followed. She did not complain of constitutional symptoms. She had used this specific hair dye numerous times before, without incident. On this occasion the application and removal of the dye were unremarkable as well.



Fig. 1. The brand of hair dye used by the patient.

The patient had erythema, oedema and epidermal wrinkling peri-orbitally. Erythematous papulovesicles of the face, hairline and neck were consistent with an eczematous reaction. The scalp was covered by a thick scale with honey-coloured crust on the hairline. This clinical finding, as well as the pustules on the face, indicated the likelihood of an infective process. There was striking conjunctival injection and facial oedema (Fig. 2a-c). Systemically the patient was stable with a temperature of 36.9 degrees.

A working diagnosis of allergic contact dermatitis (ACD) with secondary infection was made.

After treatment had already been initiated, the patient was patch tested with 43 standard allergens and a positive reaction to PPD (paraphenylenediamine) confirmed the diagnosis (Fig. 3).

The scalp crust was removed with wet compresses. The eczema in all areas was treated with a potent steroid cream rapidly weaned over a period of 5 days



Fig. 2. Before treatment: (a & b) multiple papules, wet areas with yellow crusts suggestive of secondary infection, involving scalp, hairline and extending onto the face; (c) severe conjunctivitis and periorbital swelling.

as the reaction resolved. Lubricants were used for the conjunctivitis.

Systemic treatment was oral flucloxacillin for staphylococcal secondary infection.

The patient was discharged 6 days after admission showing improvement (Fig. 4). On follow-up 1 week later, her skin and scalp were almost completely normal.



Fig. 3. Positive PPD patch test



Fig. 4. Day 5 post treatment: resolution with mild post inflammatory changes.

Discussion

In patients presenting with eczema of the face and scalp the differential diagnosis should always include contact dermatitis (irritant contact dermatitis (ICD), ACD or a combination of both), underlying skin disease (atopic dermatitis, seborrhoeic dermatitis) or infective conditions such as tinea capitis (especially the more inflammatory zoophilic subtypes).

Chronic ICD is a nonspecific response of the skin to direct chemical damage that occurs when cumulative insults exceed the threshold for the appearance of dermatitis (e.g. frequent hand washing). Its manifestations may be less dramatic, with erythema, mild oedema, scaling, hyperkeratosis and fissuring. Acute ICD occurs when the concentration of the chemical is such that the irritant reaction can be related to the onset of the dermatitis.

ACD requires a period of contact with the allergen (10-14 days in the case of a strong allergen, but it may be much longer) to induce sensitisation, after which the elicitation phase (contact with the allergen to presentation of the dermatitis) occurs which may range from minutes to days.¹

In a study of patients with clinically suspected cosmetic dermatitis patch testing revealed positive reactions to fragrances (51.5%), preservatives (39.3%), PPD (21.1%), cetrimide and butyl hydroquinone (12.1% each).²

In a cosmetic study in America, skin-care products were the most common cause of adverse reactions, followed by hair preparations.³

PPD is commonly found in permanent hair dyes. It is colourless until oxidised by hydrogen peroxide in the presence of ammonia. Once oxidised it is no longer considered allergenic. Hair dyes containing PPD can be easily recognised as the product comes in two bottles that require mixing to allow the oxidation reaction to occur.

The open application consumer test with the dye is advocated as a method to prevent reactions to dye products. This is done on a 50c-sized area of retroauricular or antecubital fossa skin and left uncovered for 48 hours. It should be done prior to every intended use of the dye, and not just before the first application.⁴ This is however rarely done by the consumer or the hairdresser, and the test itself may serve to sensitise the subject.

In hairdressers PPD allergy will more likely manifest as hand eczema.⁵

Positive patch test results for PPD in population studies range from 0.1%-2.3%.⁶

PPD may also be found mixed with henna (to enhance the dark colour). In this mixed form it is used in temporary tattoos and in hair dyes.⁷ These tattoos may well be responsible for the increased incidence of PPD allergy.

Other hair-grooming products and contact dermatitis

Hair products include shampoos, conditioners, hair dyes, relaxers, gels/mousses, permanent wave solutions, etc.⁸ Products that are rinsed off, such as shampoos, are diluted by water and their contact time is short. This lessens the chance that they might cause ACD. Products that stay on longer, or are permanently in contact with the scalp, are more likely to be the sensitiser in ACD.

Thioglycolates (used in acid perms) in particular may persist in allergenic form for up to 3 months, and result in a long-lasting dermatitis.

Other agents (nonhair products) to consider in scalp dermatitis would be nickel allergy to hair pins and latex/rubber allergy to rubber bands or the glue in hair extensions.⁹

A reaction to the allergens in Table I on patch testing should alert one to the possible role of cosmetics, including hair products, in causing scalp dermatitis and to the diagnosis of ACD.

Conclusion

Prior use of a specific hair dye, or repeated use, does not guarantee that every application thereafter will be without incident.

PPD sensitisation can occur at any time. The current increased trend in temporary tattooing has resulted in an increased incidence of PPD allergy.

Table I. Allergens in cosmetic products

Type of product	Substance in most standard battery screening patch tests
Fragrances	Balsam of Peru, fragrance mix
Preservatives	Parabens, formaldehyde, quaternium-15, imidazolidiny urea, Kathon 6, Euxyl K400
Dyes	PPD
Rubber components	Thiuram/carba/mercapto mix
Metals	Nickel ¹⁰

All hair care products have the potential to cause ACD.

Declaration of conflict of interest

The authors declare no conflict of interest.

REFERENCES

1. Rietschel RL, Goossens A, Conde-Salazar L, Veien NK. *Atlas of Contact Dermatitis*. London: Informa Health Care, 1999: 2.
2. Tomar J, Jain VK, Aggarwal K, Dayal S, Gupta S. Contact allergies to cosmetics: testing with 52 cosmetic ingredients and personal products. *J Dermatol* 2005; **31**: 951-955.
3. Wolf R, Wolf D, Tuzun B, et al. Contact dermatitis to cosmetics. *Clin Dermatol* 2001; **19**: 502-515.
4. Krasteva M, Cottin M, Cristaudo A, et al. Sensitivity and specificity of the consumer open skin allergy test as a method of prediction of contact dermatitis to hair dyes. *Eur J Dermatol* 2005; **15**: 18-25.
5. Uter W, Lessmann H, Geier J, Schnuch A. Contact allergy to ingredients of hair cosmetics in female hairdressers and clients – an 8-year analysis of IVDK data. *Contact Dermatitis* 2003; **49**: 236-240.
6. Khumalo NP, Jessop S, Ehrlich R. Prevalence of cutaneous adverse effects of hair dressing. *Arch Dermatol* 2006; **142**: 377-383.
7. Raboobee N. Sensitisation from PPD in temporary henna tatoos and subsequent severe allergic contact dermatitis from hair dye. *Current Allergy & Clinical Immunology* 2004; **17**: 194-195.
8. Bolduc C, Shapiro J. Hair care products: waving, straightening, conditioning, and coloring. *Clin Dermatol* 2001; **19**: 431-436.
9. Cogen FC, Beezhold DH. Hair glue anaphylaxis: a hidden latex allergy. *Ann Allergy Asthma Immunol* 2002; **88**: 61-63.
10. Rycroft RJG, Menne T, Frosch PJ, Benezra J, eds. *Textbook of Contact Dermatitis*, 2nd ed. Berlin: Springer-Verlag, 1995: 182, 374.

PRODUCT NEWS

Long-chain polyunsaturated fatty acids influence the immune system of infants

Gottrand F. EA 3925, IFR 114, Faculty of Medicine and University of Lille 2, Lille, France. fgottrand@chru-lille.fr

Several events occur during the first months of life that allow the immune system to become competent and functional. The aim of this article is to review the rationale and evidence of an influence of (n-3) long-chain PUFA (LCPUFA) on the immune system of infants. The (n-3) LCPUFA exert their immunomodulatory activities at different levels. The (n-3) LCPUFA metabolites induce eicosanoid production, alter gene expression, and modify lipid raft composition, altering T-cell signalling; all contribute to immunological functional changes. However, the roles of these mechanisms and the types of T or other immunological cells involved remain unclear at present. Moreover, the effect of (n-3) LCPUFA on the immune system of infants may vary according to dose, time of exposure, and



profile of the immune system (T-helper, Th1/Th2). Most of the interventional studies in infancy have been performed for the prevention of allergy. They all confirmed influence on T-cell function and cytokine profiles, but clinically beneficial effects are more conflicting. Supplementation of the maternal diet in pregnancy or early childhood with (n-3) LCPUFA is potentially a noninvasive intervention strategy to prevent the development of allergy, infection, and possibly other immune-mediated diseases. However, any long-term *in vivo* effects on (n-3) LCPUFA early in life for immunomodulatory defence in infants and later on immune status and health remain to be assessed.

J Nutr 2008; 138(9): 1807S-1812S.

For more information please contact Nestlé Consumer Services on 0860 09 67 89