

Discoid lupus triggered by allergic contact dermatitis caused by a hair dye

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Cutaneous lupus erythematosus (CLE) is a clinical spectrum of autoimmune skin diseases, including acute cutaneous lupus erythematosus, sub-acute cutaneous lupus erythematosus, and discoid cutaneous lupus erythematosus (DCLE) (1–4). CLE can be triggered by various external factors, such as ultraviolet light, medication, infections, and irritant contact dermatitis. In addition, DCLE can be stimulated by allergic contact dermatitis. We describe here the case of a young woman with a history of DCLE who presented with an exacerbation of lupus lesions on the neck, on the upper back and in the

retro-auricular area following severe contact dermatitis caused by a hair dye.

Case Report

A 32-year-old woman with a history of DCLE presented at the dermatology department with itchy red inflammatory lesions in the retro-auricular area and on the upper back (Fig. 1a, b). The lesions had appeared following the application of a hair dye that had been well tolerated in the past. The clinical diagnosis of sub-acute allergic contact dermatitis was made. The lesions responded rapidly to local treatment with a potent topical corticosteroid cream, and completely disappeared within 1 week.

Two weeks later, however, a new eruption of sharply demarcated erythematous plaques emerged in a distribution identical to that of the previous lesions (Fig. 2a, b). A punch skin biopsy was taken from such

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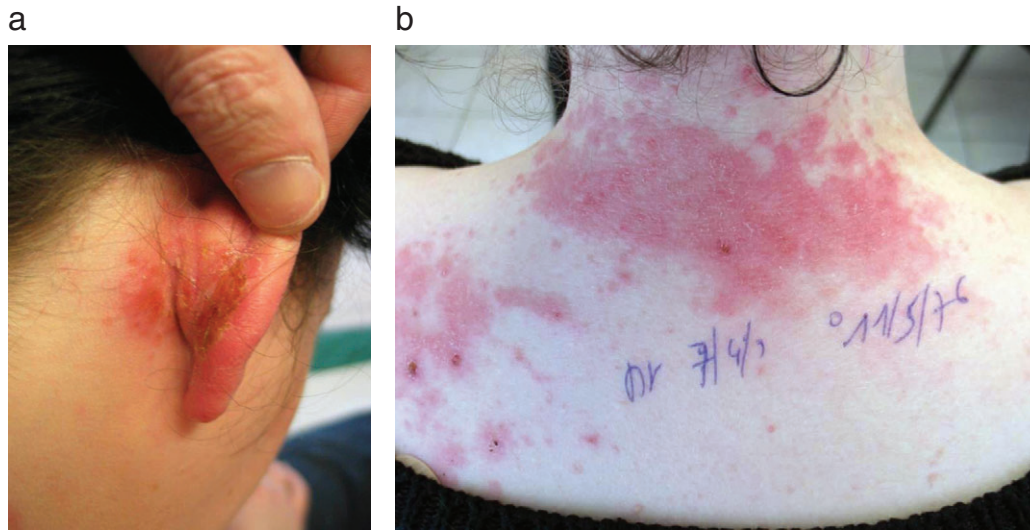


Fig. 1. Allergic contact dermatitis in the (a) retro-auricular area and (b) neck and upper back following hair dye application.

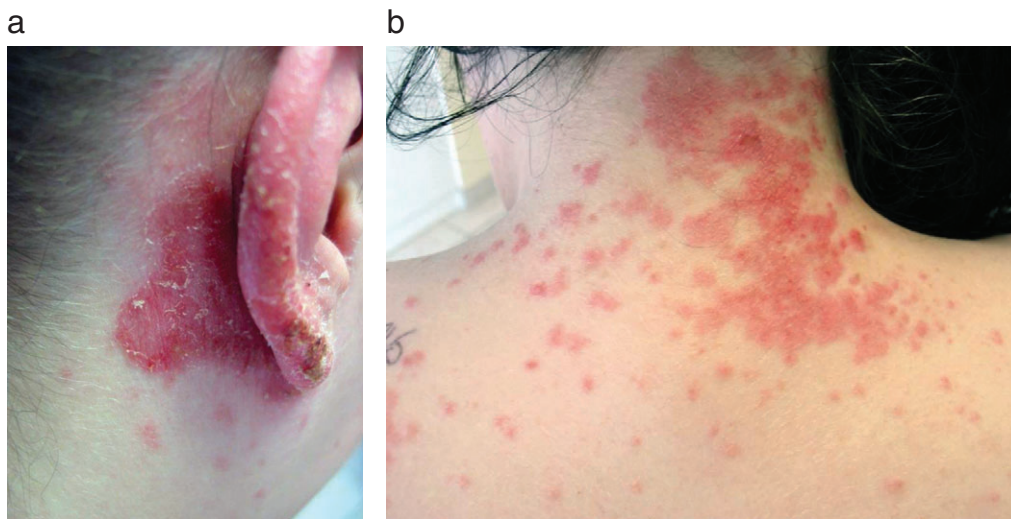


Fig. 2. (a, b) Two weeks later, the lesions have transformed into discoid cutaneous lupus erythematosus (confirmed by histology).

a lesion behind the right ear, and showed epidermal vacuolopathy with interphase dermatitis and a lymphocytic peri-adnexal inflammatory infiltrate compatible with DCLE. Direct immunofluorescence staining was not performed. Blood analysis comprising a complete blood count, C-reactive protein, sedimentation rate and antinuclear antibodies did not show any abnormalities.

Patch testing was performed, using Ultra Q® chambers (Chemotechnique, Vellinge, Sweden) covered with Mefix® (Mölnlycke Healthcare, Göteborg, Sweden), with the European baseline series, the hairdresser series (Chemotechnique), and the hair dye mix used 'as is' (semi-open test), with readings being performed at day

(D)2 and D4, according to ICDRG guidelines. The tests showed positive reactions to *p*-phenylenediamine (PPD) and toluene-2,5-diamine at D2 and D4 (2+; Fig. 3), and a positive reaction to the semi-open test of the hair dye at D2 (1+). Two weeks following the application of the patch tests, the positive eczematous reactions evolved into erythematous plaques similar to the lesions behind the ears (Fig. 4). A punch skin biopsy was taken at the PPD-positive test site, and the same pattern was found as in the previous biopsy. The lesions disappeared after the application of superpotent topical corticosteroids, leaving post-inflammatory hyperpigmentation. The patient was advised not to use any permanent hair



Fig. 3. Positive patch test reactions to *p*-phenylenediamine and toluene-2,5-diamine at D4.

dye in the future, and, up to now, has not developed any recurrence.

Discussion

DCLE is an autoimmune skin disorder characterized by the development of autoantibodies that attack the skin at the interphase level (5). Exacerbations of DCLE can be triggered by various external factors, including allergic contact dermatitis, although this is a less frequently described trigger. A few case reports with positive patch test results and DCLE histopathology have involved prednicarbate (6), squaric acid dibutylester (7), cinnamal (8) and neomycin and tosylamide/formaldehyde resin (9) as possible causative allergens. However, in a recent study, patch testing showed a statistically significantly higher percentage of positive test reactions in patients with DCLE than in a healthy control group (10). This might imply that allergic contact dermatitis is a more prevalent and important trigger than currently acknowledged. Underlying contact allergies might be misdiagnosed when a patient presents in the late stage of discoid lupus, in the absence of eczema and a suggestive history.

The trigger mechanism exerted by allergic contact dermatitis is currently unknown. It is speculated that local lupus activity is stimulated by cross-acting cytokines released by the eczematous inflammatory process (7). In discoid lupus lesions, multiple cytokines, including interleukin-2, tumour necrosis factor- α , and interferon- γ , are primarily released by T-helper 1 lymphocytes (11). This contrasts with systemic lupus erythematosus, which is primarily mediated by cytokines of T-helper 2 lymphocytes (5, 11, 12). Because the inflammatory infiltrate of allergic contact dermatitis consists of similar type 1



Fig. 4. Two weeks later, the positive test reactions have transformed into discoid cutaneous lupus erythematosus (confirmed by histology).

mediators, some authors have suggested that dormant memory cells might be activated by the released cytokines (7, 13). This leads to a late-stage flare-up of discoid lupus in the same distribution as the initial spongiotic allergic contact dermatitis (7). However, further studies are required to confirm this theory.

In our case, the triggering allergen was found to be PPD, a potent contact sensitizer, for which other atypical clinical presentations have been reported, such as Sweet-syndrome-like dermatosis (14), erythema multiforme (15), angioedema (16), and leukoderma (17). However, to our knowledge, this is the first case of an exacerbation of DCLE following the application of a PPD-containing hair dye in a sensitized individual.

Conclusion

Allergic contact dermatitis caused by PPD in hair dyes is frequently severe, but may also trigger local exacerbations of pre-existing dermatoses, including DCLE, as in this case. When patients consult at a later stage, that is, with DCLE, the underlying contact allergy may be missed.

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