

Short Communication

Erythema-multiforme-like eruption and depigmentation following allergic contact dermatitis from a paint-on henna tattoo, due to para-phenylenediamine contact hypersensitivity

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For several years, PPD has been used to darken the henna dye used for paint-on tattoos (1–4).

Case Reports

A 9-year-old girl received a paint-on tattoo on her right upper arm in August 2000, a week before her flight back home from Egypt. The day before departure, the tattoo had been repainted. 24 h later, she developed itching, papules and vesicles in the tattoo area. The lesions improved slowly after topical treatment with hydrocortisone butyrate, but depigmentation, developing in the area of the tattoo, persisted for 6 months.

Her 11-year-old sister also received paint-on tattoos on her right upper arm, as well as on the back of her fingers, a week before the flight back home. The day before departure, the tattoo had been repainted. 24 h later, she developed itching, papules and vesicles in the tattoo areas. After resolution of the lesions on topical treatment with hydrocortisone butyrate, depigmentation developed, which still persists. Nearly 4 weeks after application of the tattoo, the older girl developed erythema-multiforme-like lesions on her hands and forearms. There were no allergic reactions in her case history, no atopic eczema, no history of hair dyes, and no history of infection for more than 6 weeks prior to the eruption.

An 11-year-old boy in the same tourist party had received a tattoo (skull) on the upper arm which had been repainted after 9 days. 3 days later, the boy developed symptoms similar to those observed in the 2 girls. They resolved after topical treatment with mometasone furoate. Hypopigmentation was seen for 2 months.

2 siblings, a 13-year-old boy and his sister, 17 years old, also received such tattoos in Egypt on their right upper arms. 1 day after the tattoos had been repainted, itching, papules and vesicles developed and were cleared with topical corticosteroids. On the arm of the girl, hypopigmentation in the former tattoo area still persists.

Patch testing was performed with hair-dye substances as well as textile colours and henna products, according to the guidelines of the German Contact Allergy Group. Lawsone, the known quinonoid constituent of henna (*Lawsonia inermis* L.), as well as natural henna products, were used to detect hypersensitivity to henna (Table 1).

p-phenylenediamine was strongly positive in all patients. Cross-reactions to 3- and 4-aminophenol, isopropyl-PPD, p-aminoazobenzene, 4-toluylenediamine and Disperse Orange 3 were also observed. Lawsone produced only 1 slight irritant reaction.

Discussion

Since 1997, there have been increasing reports of sensitization to PPD/henna mixtures (4), which tourists remain unaware of. Erythema multiforme (EM) may develop with or without a primary eczematous component or more commonly during resolution of acute allergic contact dermatitis (5). To the best of our knowledge, this is the 1st report of EM following contact hypersensitivity to PPD.

Hypopigmentation after contact dermatitis has previously been described with monobenzyloether of hydroquinone, 4-tertiary butylcatechol and p-tertiary butylphenol, kojic acid, catechol, squaric acid dibutylester, cerium oxide, tulipalin A, cinnamal, thiotepa, acrylics and nickel, as well as PPD (4, 6, 7). 3 mechanisms have been postulated, photoleukomelanoderma due to pigment blockade, reduction of melanin synthesis, selective destruction of melanocytes (4), as well as Koebner-induced vitiligo. Contact leukoderma due to PPD has previously been described, the mechanism being unknown (8–13).

The sensitization of children to PPD has important consequences for their future choice of occupations, e.g., hairdressing.

Table 1. Results of D3 patch test readings

Substance	%	Case no. 1	Case no. 2	Case no. 3	Case no. 4	Case no. 5
PPD	1%	+++	+++	+++	++	++
isopropyl-PPD	0.1%	—	—	+	—	—
4-toluylenediamine	1%	NT	NT	+++	—	++
4-aminophenol	1%	++	+++	+	—	—
3-aminophenol	1%	NT	NT	+	—	—
4-aminoazobenzene	0.25%	NT	NT	+++	—	—
Disperse Orange 3	1%	+++	+++	+++	—	++
natural henna	1:3	—	—	NT	NT	NT
lawsone	10%	NT	NT	IR	—	—

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