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Contact dermatitis after temporary henna tattoos – an increasing phenomenon

Severin Läuchl, Stephan Lautenschlager

Outpatient Clinic of Dermatology, Triemli Hospital, Zürich, Switzerland

Summary

Four patients developed contact dermatitis to black henna tattoos on holiday in the Middle East and Asia. Two to ten days after skin painting an itchy, reddish swelling developed at the site of the tattoo exactly following its sharply demarcated borders. Histological investigation of the lesions revealed spongiotic dermatitis with dense lymphohistiocytic infiltrates. Patch testing in all patients showed a strong reaction to *p*-phenylenediamine (PPD). The other tests, including standard series and henna powder, were all negative. Healing time after application of topical class III and IV steroids was prolonged. These reports show an impressive side effect of temporary tattoos with possible long-term damage. Rather than henna, the causative agent in the pastes used for temporary tattoos appears to be PPD, a widely used dye that is added to the pastes in high concentrations to produce a darker shade. The growing incidence of this complication requires close observation, while practitioners should be aware of this sensitisation and of possible subsequent allergic reactions, especially after hair colouring with dyes based on PPD.

Keywords: henna; p-phenylenediamine; temporary tattoo; contact dermatitis

Introduction

Henna, an extract of the plant *Lawsonia*, has been used for centuries in many cultures, mainly as a dye for hair and nails as well as for decorative body painting. Reports of allergic reactions to henna are very rare and include case reports of contact dermatitis [1–6] and immediate-type reactions to henna [7, 8].

Recently a new trend has emerged in Western countries, the application of temporary tattoos with henna paste (*mehndis*). The tattoos are applied with fine brushes or syringes, often by street vendors, and last two to three weeks before fading. In the past two years there have been a few brief reports of single cases with allergic reactions to temporary tattoos of this kind [9–15].

Results

Within a period of 3 months we examined four patients with dermatitis after skin painting without a previous history of allergic disease.

Patient No. 1, a 31-year-old male, had a temporary henna tattoo applied to his right forearm by a street vendor in Pattaya, Thailand. One week later he had a second temporary tattoo applied to his left forearm by the same artist. Two days after the second tattoo, he developed an intensely itching, papulovesicular swelling at the site of both tattoos (Fig. 1). Patient No. 2, a 32-year-old female, presented with the same history. Ten days after the first henna tattoo on her right forearm in the Sinai, Egypt, a second temporary tattoo was painted on the left upper arm in the same shop. Two days later a strongly pruritic papulovesicular reaction developed at the site of both tattoos. Patients Nos. 3 and 4, a 43-year-old male and his 33-year-old girlfriend, had temporary tattoos applied to their arms and shoulders, also in the Sinai. Ten (patient No. 3) and 14 (patient No. 4) days later, both developed erythematous papulovesicular reactions at the tattoo sites (Fig. 2). In all the patients a biopsy was taken which showed acute dermatitis (Fig. 3). Patch testing was performed 4–6 weeks later (European standard series [Hermal®], henna powder in petrolatum and commercially available henna paste for temporary tattoos). Readings after 72 hours were all negative except for a strongly positive reaction to *p*-phenylenediamine in all four pa-

tients. No reaction was observed to henna powder or commercially available *mehndi* paste.

Even after application of betamethasone-dipropionate cream (Diprolen®) twice daily for two weeks, some slight skin infiltration could still be noted (Fig. 4) in patient No. 1. After two further weeks with clobetasone-butyrate (Emovate®), the lesions were completely healed. In spite of

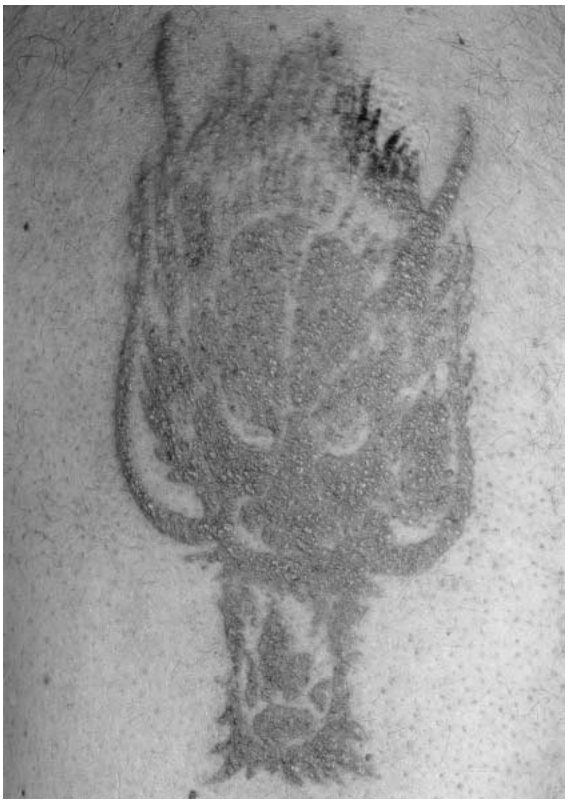

Figure 1

Sharply demarcated, papulovesicular reaction following the borders of a temporary henna tattoo on the shoulder of patient No. 1, appearing 2 days after the application of a second tattoo.

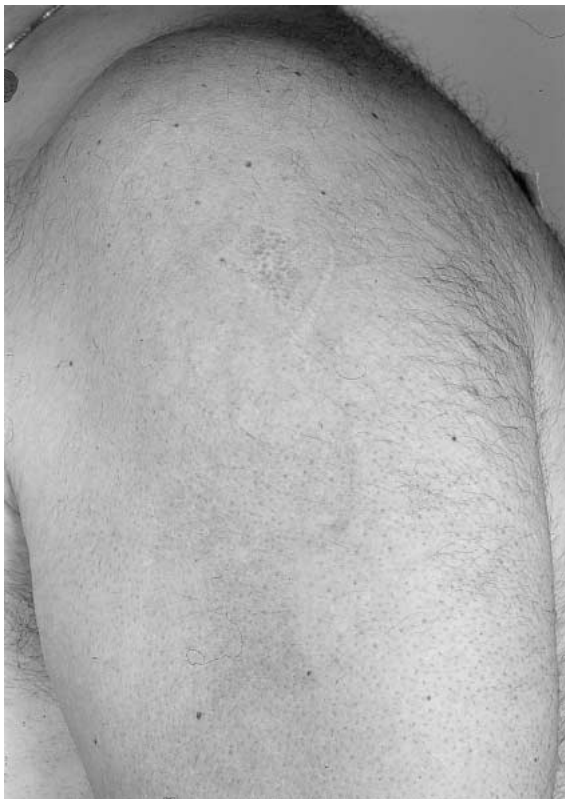

Figure 4 ▶▶

Residual infiltration and pigmentation at the site of the temporary tattoo on the shoulder of patient No. 1 after application of betamethasone-diproprionate for 2 weeks.

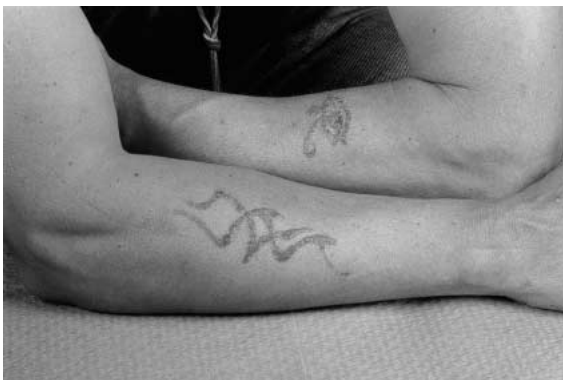

Figure 2

Contact dermatitis at the site of 2 temporary henna tattoos on the forearms of patient No. 3 after the dye had remained on the skin for 10 days.

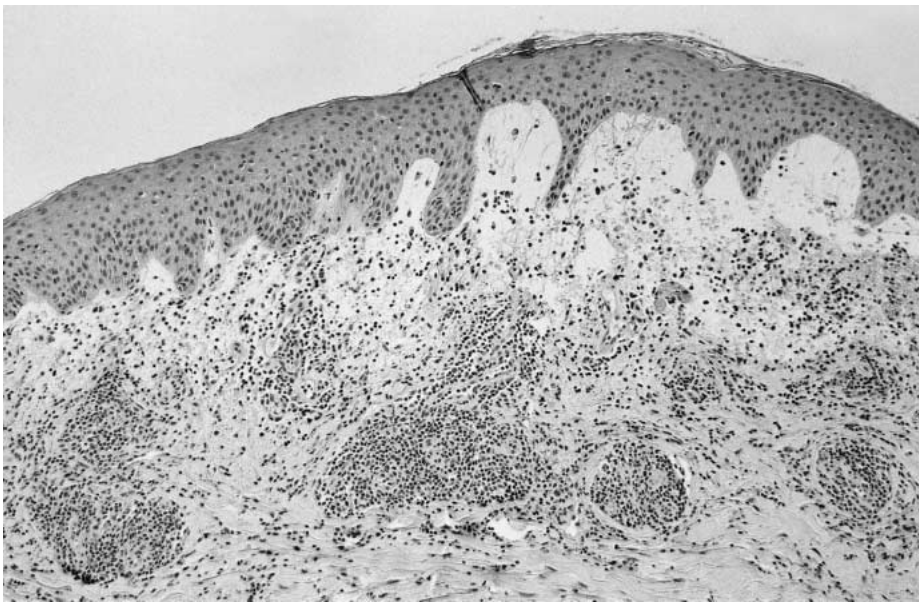

Figure 3

Biopsy specimen showing acute dermatitis with epidermal intercellular oedema and microvesiculation, superficial perivascular lympho-histiocytic infiltrates and eosinophils (HE, ×25).

therapy with halomethasone cream (Sicorten®), after a few days patient No. 3 showed spreading pruritic papulovesicules on his hands. The lesions on his arms were still faintly visible after four further weeks of continued local therapy. Patients Nos. 2 and 4 showed complete healing after 4 weeks with daily application of halometasone cream (Sicorten®).

Discussion

Apart from its worldwide use as a dye for hair, henna has served many other purposes over the centuries. In Islamic countries and India in particular, it is also employed for decorative body paintings on the hands and feet of married women, as well as by participants in marriage ceremonies and other social rituals. The colouring agent of henna is 2-hydroxy-1,4 naphthoquinone.

Despite its widespread use, reports of contact dermatitis to henna are very rare. It can therefore be assumed that henna is a very weak skin sensitiser. Three case reports from India present patients who applied henna paste as a skin colorant [1, 3] or medication for a skin irritation [2] and subsequently developed erythematous and blistering eruptions at these sites. These patients all reacted positively in patch tests with pure henna. Case reports of patients from Europe with positive patch tests for henna include dermatitis after application of henna as a dye for hair [4], finger nails [5] and as a component of sun tan lotion [6]. Furthermore, there are two reports of hairdressers who developed immediate-type hypersensitivity to henna with urticaria, sneezing and asthmatic symptoms [7, 8]. It may be noted that most of the early reports stem from India [1–3]; only the more recent reports are from European countries [4–8].

Whilst henna body paintings have been used in certain cultures for many centuries, the use of henna paste for temporary tattoos has become popular with Western populations only in recent years. To enhance its colouring effect, henna is often used in combination with additives such as ground coffee, beet juice or PPD. Such tattoos are often applied by street vendors in holiday resorts in the Middle East and Asia, as well as in tattoo shops throughout the Western world. Allergic reactions to such tattoos are rarely described [9–15].

The reactions observed in patients Nos. 1 and 2 exactly followed the chronological pattern of a delayed-type allergy with a sensitisation phase after the first application and a dermatitis reaction after the second application. In patients 3 and 4 the allergic reactions only appeared after the noxious agent had remained on the skin for 10 and 14 days respectively. It must be assumed that active sensitisation occurred during the long period of skin contact with the dye. The local reactions were all unusually intense, even associated in one patient with a generalised dermatitis reaction. Healing time was prolonged in all patients.

Patch tests showed no reaction to pure henna powder or commercially available *mehndi* paste, but they all reacted strongly to PPD. The complete ingredients of the pastes used for these temporary tattoos are usually a secret and cannot be determined, as exactly the same paste is no longer available when patients present themselves at a clinic in their home country. However, most of the previously published cases from the West, if they were patch tested, reacted to PPD [9, 10, 14, 15]. The same was true of all our tested patients. We must therefore assume that PPD, a well-known contact allergen [16, 17], is the main allergenic ingredient in some of the henna pastes used for temporary tattoos, especially the black henna preparations. The unusual intensity of the reaction after only one contact with the sensitising agent prompts the suspicion that PPD may be present in very high concentrations in these pastes. Theoretically, the possibility remains that other components of the dye mixture used may react as well, and PPD would only show crossreactivity.

These cases merit our interest because they show an unusually intense contact dermatitis reaction with prolonged healing time. Furthermore, the allergic reaction resulted from a substance which enjoys growing popularity and whose probable main allergenic ingredient, PPD, is also contained in many products such as hair and textile dyes used very widely in the Western world. The incidence of allergic reactions to black henna tattoos definitely appears to be rising. Considering that henna pastes do not have to contain PPD and that allergic reactions to henna itself are extremely rare, measures should be taken to avoid the use of black henna pastes containing PPD or other diaminobenzenes for temporary tattoos.

Correspondence:
Dr. med. St. Lautenschlager
Dermatologisches Ambulatorium
des Stadtspitals Triemli
Herman Greulichstrasse 70
CH-8004 Zürich
e-mail: stlauten@swissonline.ch

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Correction

Schanz U. Allogeneic haematopoietic stem cell transplantation with reduced intensity conditioning regimens ("minitransplants") Swiss Med Wkly 2001; 131:59–64.

In this paper we failed to publish the regimen numbers in table 1. As the numbers are cited in table 2, this second table can not be understood correctly. The correct version of table 1 is published here.

Table 1

Reduced intensity conditioning regimens.

Regimen	reference
1. Fludarabine 30 mg/m² × 4, cytosine arabinoside 2 g/m² × 4, idarubicine 12 mg/m² × 3	[22, 23]
2. 2-chlorodeoxyadenosine 12 mg/m² × 5, cytosine arabinoside 1 g/m² × 5	[22, 23]
3. Fludarabine 30 mg/m² × 4, melphalan 140–180 mg/m² ×1	[22, 23]
4. 2-chlorodeoxyadenosine 12 mg/m² × 5, melphalan 180 mg/m² ×1	[23]
5. Fludarabine 30 mg/m² × 3–5, cyclophosphamide 300–1000 mg/m² × 2–3	[21, 23]
6. Fludarabine 30 mg/m² × 2, cytosine arabinoside 500 mg/m² × 2, cisplatin 25 mg/m² × 4	[21]
7. Fludarabine 30 mg/m² × 6, busulfan 4 mg/kg × 2, antithymocyte globulin 10 mg/kg × 4	[12, 23]
8. Cyclophosphamide 50 mg/kg × 4, antithymocyte globulin15–30 mg/kg × 3–4 pre-/posttransplant, thymic irradiation 7 Gy × 1	[24]
9. Fludarabine 25 mg/m² × 5, cyclophosphamide 60 mg/m² × 2	[1]
10. Single-dose TBI (200 cGy) ± fludarabine (30 mg/m² × 3)	[15, 16]

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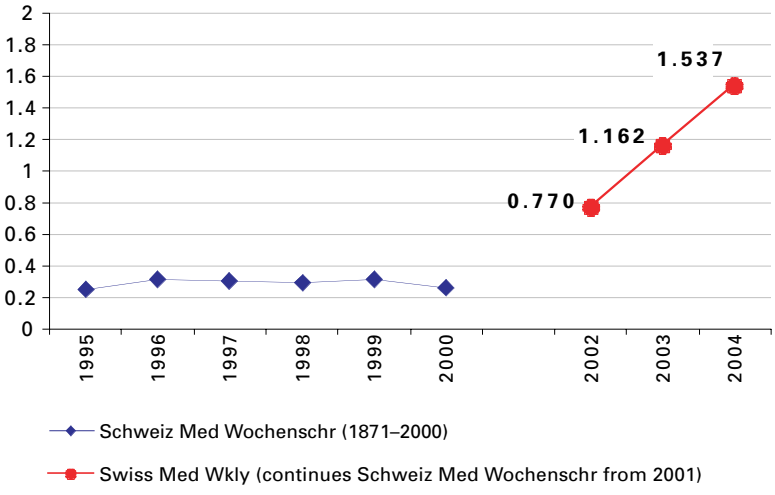

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