



Allergic contact dermatitis mimicking angioedema due to paraphenylenediamine hypersensitivity: a case report

Gulsen Tukenmez Demirci, Ilknur Kivanc Altunay, Guldehan Atis & Asli Kucukunal

To cite this article: Gulsen Tukenmez Demirci, Ilknur Kivanc Altunay, Guldehan Atis & Asli Kucukunal (2012) Allergic contact dermatitis mimicking angioedema due to paraphenylenediamine hypersensitivity: a case report, Cutaneous and Ocular Toxicology, 31:3, 250-252, DOI: [10.3109/15569527.2011.641195](https://doi.org/10.3109/15569527.2011.641195)

To link to this article: <http://dx.doi.org/10.3109/15569527.2011.641195>



Published online: 19 Dec 2011.



Submit your article to this journal [↗](#)



Article views: 178



View related articles [↗](#)



Citing articles: 11 View citing articles [↗](#)

CASE REPORT

Allergic contact dermatitis mimicking angioedema due to paraphenylenediamine hypersensitivity: a case report

Gulsen Tukenmez Demirci, Ilknur Kivanc Altunay, Guldehan Atis, and Asli Kucukunal

Dermatology, Sisli Etfal Training and Research Hospital, Istanbul, Turkey

Abstract

Active sensitization to paraphenylenediamine (PPD) and related compounds from temporary black henna tattoos has become an epidemic in the recent years. Hair dyes also include PPD like black henna tattoos which cause allergic contact dermatitis. Skin lesions of allergic contact dermatitis from PPD are mostly seen as an exudative erythema, an erythema multiforme-like eruption or a bullous contact dermatitis. We, herein, report a 27 year-old woman with an angioedema-like reaction occurring after the first exposure to hair dye who was unaware of being previously sensitized to PPD from black henna tattoo.

Keywords: Contact sensitization, black henna tattoo, hair dye

Introduction

Paraphenylenediamine (PPD) is a chemical compound known to have a high risk in the occurrence of contact sensitization (1,2). Active sensitization to PPD and related compounds from temporary tattoos has become an epidemic in the recent years (3). Hair dyes, fur dyes, textile dyes, printer's ink, some latex gloves, rubber support stockings, lacquers, leather, eye shadows, shoe polish, black henna tattoos include PPD in their contents (2). Although pure henna is known to be harmless, PPD is used in henna to make the color darker and accelerate the potency of dyeing procedure (4,5). Hair dyes are important causes of dermatitis both in clients, and in hairdressers mostly from PPD and their derivatives (6). Moreover, also immediate-type reactions or the contact-urticaria syndrome may occur (7,8). Herein, we report, a 27-year-old woman with severe edema of eyelids and upperface after the first exposure to hair dye who have been found to be sensitized before by a black henna tattoo to PPD.

Case report

A 27 year-old young woman presented to emergency room with severe edema involving the upper and lower

eyelids of both eyes, the forehead and the scalp. She was diagnosed as angioedema initially and referred to our dermatology clinic. A thorough systemic examination revealed no other focus of allergic activity. On dermatological examination, there was a severe edema which was beginning from eyelids extending to the scalp. A slight erythema limited to the frontal hair line was present (Figure 1). Ophthalmic examination revealed no abnormality. All laboratory values were within the normal range. She did not have any history of atopic event or an allergic reaction to medicines or any other known allergens in the past. She used hair dye for the first time in her life 2 days before the occurrence of the skin reaction. We started methylprednisolone sodium succinate 60 mg/day intravenous and pheniramine maleate 45.5 mg intravenous for twice a day for 5 days. The methylprednisolone dose was reduced gradually as 48 mg, 32 mg, 16 mg, and finally 8 mg in every 3 days after the clinical improvement was seen. Three weeks after the end of the medication, we performed a patch test including the European standard series (True test®) of allergens to the patient. At the end of the second day, a positive reaction to PPD was observed with papules and vesicles on erythematous test area (Figure 2). She denied an allergic reaction to black henna tattoo,

Address for Correspondence: Dr. Gulsen Tukenmez Demirci, Dermatology, Sisli Etfal Training And Research Hospital, Etfal Sok, 34377, Istanbul, Turkey. E-mail: gulsentukenmez@yahoo.com

(Received 25 August 2011; revised 28 October 2011; accepted 08 November 2011)



Figure 1. Severe edema of eyelids and frontal area extending to the scalp, erythema limited to frontal hair line.



Figure 2. Positive patch test result to paraphenylenediamine.

4×5 cm in size, on her shoulder, 2 years ago after we inquired the patient with the patch test result. She was told that she had an allergy to PPD and cross-reacting substances. She was instructed not to get black henna tattoos anymore and to avoid dyeing her hair with any products containing PPD or other para-dye ingredients. We gave a list of products that may contain PPD or cross-react with it. She was recommended to use PPD-free hair dyes.

Discussion

Allergic contact reactions according to hair dyes occur mostly due to the sensitization of PPD. The main contact allergen in hair dye is PPD, which is followed by its derivatives para-aminodiphenylamine, o-nitro-p-phenylenediamine, and paratoluenediamine. Sensitization to PPD derivatives could cause cross-reactions (1). In black henna tattoos, the concentration of PPD has been shown to be as high as 15.7%, which is much stronger than the concentrations used in hair dyes (9). This higher PPD concentration, combined with the extended period of skin exposure without neutralization, results in potent skin sensitization to PPD. Subsequent exposure to PPD even in low concentrations, such as those in hair dyes can then lead to a delayed type-IV hypersensitivity reaction manifesting as an acute contact dermatitis (5). These reactions usually occur one or more days after the exposure to the hair dyes (10,11). In our patient, the reaction occurred 2 days after the hair dye exposure due to PPD.

It is rare to develop an allergic reaction to pure henna, but black henna tattoos are preferred cosmetic products among young people which includes uncontrolled amount of PPD (12). PPD causes the dark colour, hastening dye, and makes tattoos long lasting although it is known to be potent skin sensitizer (5,11). In our patient, positive allergic reaction to PPD was demonstrated with the patch test.

Skin lesions of allergic contact dermatitis from PPD has been reported to be exudative erythema, erythema multiforme-like eruption, bullous contact dermatitis, pruritic, edematous, erythematous scaly patches and plaques or vesicular lesions (4,13). In our patient, only a severe edema was prominent initially and misdiagnosis of angioedema was made in the emergency room, because no sign of dermatitis was present. Allergic contact dermatitis mimicking angioedema has been previously reported in the literature, but it was due to castor oil (14). Contact-urticaria syndrome may be in the differential diagnosis for the hair dye allergic reactions which appears immediately (mostly within 5–20 min, exceptionally later) upon contact with the causal agent (15). We excluded this diagnosis because the reaction occurred 2 days after the hair dye exposure in our patient.

Interestingly, our patient exposed to hair dye for the first time in her life and the sensitization phase of allergic reaction has been achieved by black henna tattoo which had been performed 2 years ago. Angioedema-like reaction occurred 2 days after hair dyeing, which confirm to delayed type hypersensitization. Therefore, patch tests results confirmed this relationship between hair dye and black henna tattoo.

Conclusion

We think that the patients with severe edematous reactions after the first exposure of hair dyes may previously be sensitized from other PPD containing materials. Black

henna tattoos have PPD in their contents and they may sensitize users, although they are known to be harmless. Patch testing should be performed to patients who react to hair dyes to elucidate the cause and to prevent from further severe reactions.

Declaration of interest

The authors report no conflicts of interest.

References

1. Fernández-Vozmediano JM, Padilla-Moreno M, Armario-Hita JC, Carranza-Romero C. Pattern of contact sensitization to paraphenylenediamine and its detection in hair dyes. *Actas Dermosifiliogr* 2011;102:206–211.
2. Paulsen E, Christensen LP, Andersen KE. Possible cross-reactivity between para-phenylenediamine and sesquiterpene lactones. *Contact Derm* 2008;58:120–122.
3. Le Coz CJ, Lefebvre C, Keller F, Grosshans E. Allergic contact dermatitis caused by skin painting (pseudotattooing) with black henna, a mixture of henna and p-phenylenediamine and its derivatives. *Arch Dermatol* 2000;136:1515–1517.
4. Jovanovic DL, Slavkovic-Jovanovic MR. Allergic contact dermatitis from temporary henna tattoo. *J Dermatol* 2009;36:63–65.
5. Redlick F, DeKoven J. Allergic contact dermatitis to paraphenylenediamine in hair dye after sensitization from black henna tattoos: A report of 6 cases. *CMAJ* 2007;176:445–446.
6. Søstved H, Agner T, Andersen KE, Menné T. 55 cases of allergic reactions to hair dye: A descriptive, consumer complaint-based study. *Contact Derm* 2002;47:299–303.
7. Wong GA, King CM. Immediate-type hypersensitivity and allergic contact dermatitis due to para-phenylenediamine in hair dye. *Contact Derm* 2003;48:166.
8. 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 Derm* 2003;49:236–240.
9. Robinson MK, Stotts J, Danneman PJ, Nusair TL, Bay PH. A risk assessment process for allergic contact sensitization. *Food Chem Toxicol* 1989;27:479–489.
10. McFadden JP, Yeo L, White JL. Clinical and experimental aspects of allergic contact dermatitis to para-phenylenediamine. *Clin Dermatol* 2011;29:316–324.
11. Evans C, Fleming JD. Allergic contact dermatitis from a henna tattoo. *N Eng J Med*. 2008;359:627.
12. Handa S, De D, Mahajan R. Epidemiological trends in contact dermatitis to hair dye: Comparing para-phenylenediamine positivity after a decade long interval. *Indian J Dermatol Venereol Leprol* 2011;77:511–512.
13. Gunasti S, Aksungur VL. Severe inflammatory and keloidal, allergic reaction due to para-phenylenediamine in temporary tattoos. *Indian J Dermatol Venereol Leprol* 2010;76:165–167.
14. Sánchez-Guerrero IM, Huertas AJ, López MP, Carreño A, Ramírez M, Pajarón M. Angioedema-like allergic contact dermatitis to castor oil. *Contact Derm* 2010;62:318–319.
15. Goossens A. Contact-allergic reactions to cosmetics. *J Allergy* [Online]. 2011: 467071. Available at: <http://www.ncbi.nlm.nih.gov/pmc/articles/PMC3065000/>. Accessed on 21 Feb 2011.