

Severe Allergic Contact Dermatitis From Temporary “Black Henna” Coloring of the Hair During Religious Cultural Celebrations: Three Different Cases, Same History

Miguel M. Glatstein, MD,^{1*} Ayelet Rimón, MD,¹ Dana Danino, MD,¹
and Dennis Scolnik, MB, ChB^{2,3}

Contact dermatitis after the application of temporary, paint-on, henna tattoos represents a well-known, potentially serious problem of active sensitization. We describe 3 cases involving 3 children of the same age who developed a severe contact dermatitis with massive face and neck swelling after application of black henna to their hair during “Purim” celebrations. All 3 cases had a history of having applied henna tattoos in the previous year with mild local reactions. Their reactions are presumed to be due to sensitization to *para*-phenylenediamine. Although reactions to henna are being increasingly reported, reactions of this severity seem to be rare and could lead to permanent skin changes.

Keywords: henna, tattoo, *para*-phenylenediamine, contact dermatitis, children

BACKGROUND

Purim is a Jewish holiday that commemorates the deliverance of the Jewish people, living under the ancient Persian Empire, from destruction in the wake of a plot by Haman—a story recorded in the biblical book of Esther. It is celebrated by the mutual exchange of gifts of food and drink, charity, public recitation of the Scroll of Esther, wearing of masks and costumes, and public celebration.¹ Temporary “black henna” application to the hair is an increasingly popular body

decoration employed during the celebrations.² Black henna, which does not exist naturally, is derived from natural henna after the addition of other compounds, among them *para*-phenylenediamine (PPD),³ which serves to darken the preparation for use as a temporary skin tattoo. PPD is known to be a strong sensitizer and increases the risks of allergic contact dermatitis.⁴ We report 3 children with the same clinical manifestation of severe contact dermatitis of the scalp after the application of black henna during “Purim” celebrations, a year after suffering contact dermatitis from the use of a temporary henna tattoo.

CASE REPORT

Three different boys presented to the emergency department during the same week with identical histories and clinical manifestations. The 15-, 14-, and 13-year-old boys, who were not related, presented with scalp and facial swelling that had begun the previous day and had become more severe during the hours before admission. Two days before, all 3 patients had applied black henna to their scalps as a hair dye for Purim celebrations. During the day of admission,

¹Division of Pediatric Emergency Medicine, Department of Pediatrics, Dana-Dwek Children Hospital, Sackler School of Medicine, Tel Aviv University, Tel Aviv, Israel; ²Divisions of Pediatric Emergency Medicine; and ³Clinical Pharmacology and Toxicology, Department of Pediatrics, The Hospital for Sick Children, University of Toronto, Toronto, Ontario, Canada.

The authors have no conflicts of interest to declare.

*Address for correspondence: Division of Pediatric Emergency Medicine, Dana-Dwek Children Hospital, Sackler School of Medicine, Tel Aviv University, 6 Weizman St, Tel Aviv 64239, Israel. E-mail: nopasara73@hotmail.com

swelling and itching ensued, and the patients took oral antihistamines and applied steroid ointment; however, the symptoms worsened in all of them, prompting their parents to bring them to the emergency department. All the 3 patients had been exposed to henna tattoos, with a mild local reaction, in the previous years. Physical examination revealed severe scalp and facial swelling, involving the face (Figure 1), no respiratory distress, and the remainder of the examination was normal. All 3 patients were admitted because of the severe local symptoms and were treated with local creams, oral antihistamines for symptomatic relief, and intravenous methylprednisolone. They improved within 2 days, after which they were discharged with the recommendation to avoid any type of hair dye or exposure to henna in the future.

DISCUSSION

Although cosmetics are not cited as a major source of poisoning, fatal poisoning with hair dye PPD has been described in the Middle East and North Africa.⁵ Allergic contact dermatitis to PPD contained in temporary henna tattoos is an increasingly prevalent problem worldwide; the additive PPD that is used in black henna to darken the dye has been shown to cause hypersensitivity in individuals, in some cases life-

threatening hemolysis in glucose-6-phosphate dehydrogenase deficiency.⁶ Generally, the induction of allergic contact dermatitis can take as long as 7–20 days. If a patient has had previous exposure to PPD such as that found in hair dyes or to crossreaction substances, induction time can be as short as 24–48 hours.⁷ The mechanism of sensitization is based on the conversion (by oxidation) of the prohaptens (PPD) to the haptens (quinone diamine) that can react directly with a protein, causing irritation of the skin and mucous membranes of the sensitive individuals.⁸ Crosssensitization to paraallergens may also occur; PPD crossreacts with related compounds that have an amino group in the *para* position of the benzene ring. Examples include *para*-amino benzoic acid, sulfonamides, sulfonylureas, dapsone, azo dyes, and benzocaine.^{7,9}

Permanent skin changes are a frequent consequence of this reaction⁴; however, contact sensitization resulting in massive facial, neck swelling, and airway compromise is very rare with only 2 cases reported previously.^{10,11}

Hair coloring and tattooing with henna are increasing in popularity. Besides allergic contact dermatitis, immediate reactions such as contact urticaria and systemic toxicity due to PPD can occur.¹² To avoid severe and immediate reactions, it is advisable to either avoid the product completely or to at least perform a patch test before use.¹³ Clinicians should also be aware of the potential complications of PPD, and the concentrations of PPD used in henna products should be reevaluated. To decrease these complications, there are attempts to substitute less sensitizing and crossreactive chemicals for PPD in hair dyes.¹⁴ Skin painting (pseudotattooing) with henna is traditionally performed mainly in the Muslims or in the Hindus¹⁵ and is now being seen with increasing frequency in the Jewish Purim celebrations.

Black henna used as a hair dye may cause local reactions that are severe enough to necessitate hospitalization. It is important for patients with any history of contact dermatitis to avoid this product completely. The public needs to be educated about the risk of allergic contact sensitization and of serious life-long and life-threatening consequences from this exposure.

REFERENCES

1. Hardwicke J, Azad S. Temporary henna tattooing in siblings—an unusual chemical burn. *Burns*. 2006;32:1064–1065.
2. Bourquia A, Jabrane AJ, Ramdani B, et al. Systemic toxicity of paraphenylenediamine. 4 Cases [in French]. *Presse Med*. 1988;17:1798–1800.
3. Ruiz Villaverde R, Blasco Melguizo J, Sánchez Cano D, et al. Contact dermatitis due to temporary henna tattoos [in Spanish]. *Ann Pediatr (Barc)*. 2005;62:289–290.



FIGURE 1. Severe face and neck swelling after the application of black henna hair dye.

www.americantherapeutics.com

American Journal of Therapeutics (2016) 23(1)

4. Hervella M, Durán G, Iglesias ME, et al. Reasons to advise against temporary henna tattoos [in Spanish]. *An Sist Sanit Navar*. 2005;28:403–407.
5. Sood AK, Yadav SP, Sood S, et al. Hair dye poisoning. *J Assoc Physicians India*. 1996;44:69.
6. Raupp P, Hassan JA, Varughese M, et al. Henna causes life-threatening haemolysis in glucose-6-phosphate dehydrogenase deficiency. *Arch Dis Child*. 2001;85:411–412.
7. Kazandjieva J, Grozdev I, Tsankov N. Temporary henna tattoos. *Clin Dermatol*. 2007;25:383–387.
8. Sánchez Moya AI, Gatica ME, García Almagro D, et al. Allergic contact dermatitis for temporary “black henna” tattoos [in Spanish]. *Arch Argent Pediatr*. 2010;108:e96–e99.
9. Arroyo MP. Black henna tattoo reaction in a person with sulfonamide and benzocaine drug allergies. *J Am Acad Dermatol*. 2003;48:301–302.
10. Jasim ZF, Darling JR, Handley JM. Severe allergic contact dermatitis to paraphenylenediamine in hair dye following sensitization to black henna tattoos. *Contact Dermatitis*. 2005;52:116–117.
11. Broides A, Sofer S, Lazar I. Contact dermatitis with severe scalp swelling and upper airway compromise due to black henna hair dye. *Pediatr Emerg Care*. 2011;27:745–746.
12. Xie Z, Hayakawa R, Sugiura M, et al. Experimental study on skin sensitization potencies and cross-reactivities of hair-dye-related chemicals in guinea pigs. *Contact Dermatitis*. 2000;42:270–275.
13. al-Sheikh OA, Gad el-Rab MO. Allergic contact dermatitis: clinical features and profile of sensitizing allergens in Riyadh, Saudi Arabia. *Int J Dermatol*. 1996;35:493–497.
14. Le Coz CJ, Lefebvre C, Keller F, et al. 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.
15. Corrente S, Moschese V, Chianca M, et al. Temporary henna tattoo is unsafe in atopic children. *Acta Paediatr*. 2007;96:469–471.