

## Systemic Allergic Reaction to Red Tattoo Ink Requiring Excision

Linna Duan, MA\*; Samuel Kim, MD†; Kalman Watsky, MD‡; Deepak Narayan, MD†

Sir:

**W**e present a case of a systemic allergic red tattoo reaction that required excision and skin grafting after failure of other therapies.

Tattoos are associated with an increased risk of infection, eczema, psoriasis, hyperplasia, granulomatous reactions, and neoplasm, with red ink as the most common culprit for allergic reactions. Although artists have replaced dangerous mercury-based cinnabar dyes with organic red dyes, the latter are not risk free.<sup>1,2</sup> A 48-year-old woman with a past medical history significant for rosacea, celiac disease, and migraines, as well as allergy to lanolin and sulfa, and no heavy metal allergy, was referred to our clinic after a reaction to a tattoo on the dorsum of the left foot. One month after the tattoo was completed, she reported that the red-pigmented areas became raised and pruritic, whereas the rest remained flat (Fig. 1). It is unknown what red dye was used for this tattoo. A biopsy from a red portion showed an exuberant lymphohistiocytic infiltrate with extensive cinnabar pigment deposition.

One month after the initial reaction, the patient developed a widespread eruption on her trunk and extremities showing changes consistent with dermatitis on histopathology. Topical clobetasol (Cormax), intralesional steroids, and a single CO<sub>2</sub> laser treatment did not improve symptoms. After the rash spread to her face, she was given 3 courses of systemic corticosteroids, which improved but did not resolve her symptoms.

Upon examination, the violet-colored areas were indurated; there was no evidence of the previous widespread dermatitis. The patient also demonstrated evidence for mild tinea pedis and her previously diagnosed rosacea, with scaling over the soles and pinpoint papules with erythema over the cheeks. Patch testing using the 80 allergen standard North American Screening Series, the patient's personal care products, and a select metal series was only positive for lanolin and negative for heavy metals found in tattoo dyes.



**Fig. 1.** Tattoo before intervention. Note the raised, ruborous regions exclusively demarcated by areas containing red ink.

The patient was referred for surgical excision as this was thought to be the best option for her persistent symptoms. Eight months after her initial reaction, she underwent a 6-cm excision with complex wound closure to preserve tattoo geometry. Two months later, another 15-cm excision removed the remaining induration. The wound was filled with a 15 × 6-cm full-thickness skin graft and with a 50-cm<sup>2</sup> rotation flap. Follow-up 1 week later showed a well-healed site with a complete take of the graft (Fig. 2). Her systemic symptoms also resolved.

Although allergic reactions are a known complication of tattoos, systemic reactions like the one we describe are rare. Interestingly, patch testing to mercury, manganese, and cadmium was negative in our case; this is possibly because some pigments require a haptization process to become allergenic.<sup>3</sup> Furthermore, patch testing is often negative because the reaction is caused by intracutaneous rather than epicutaneous challenge.<sup>4</sup> Laser removal is not indicated as it may worsen symptoms by releasing allergens from pigmented cells.<sup>5</sup> Thus, in cases resistant to topical or injected steroids or showing systemic symptoms, surgeons should consider immediate excision of indurated tattoos.

From the \*Yale University School of Medicine and Departments of †Plastic Surgery and ‡Dermatology, Yale University, New Haven, Conn.

Copyright © 2016 The Authors. Published by Wolters Kluwer Health, Inc. on behalf of The American Society of Plastic Surgeons. All rights reserved. This is an open-access article distributed under the terms of the Creative Commons Attribution-Non Commercial-No Derivatives License 4.0 (CCBY-NC-ND), where it is permissible to download and share the work provided it is properly cited. The work cannot be changed in any way or used commercially without permission from the journal.

Plast Reconstr Surg Glob Open 2016;4:e1111; doi:10.1097/GOX.0000000000001111; Published online 10 November 2016.

**Deepak Narayan, MD**

Department of Plastic and  
Reconstructive Surgery  
Yale University School of Medicine  
PO Box 208062  
New Haven, CT 06520  
E-mail: deepak.narayan@yale.edu



**Fig. 2.** Tattoo after skin graft. The tattoo is no longer reactive, and the skin graft has taken well, with minimal erythema and scarring.

#### **DISCLOSURE:**

*The authors have no financial interest to declare in relation to the content of this article. The Article Processing Charge was paid for by the authors.*

#### **PATIENT CONSENT**

*The patient provided written consent for the use of her image.*

#### **REFERENCES**

1. Mortimer NJ, Chave TA, Johnston GA. Red tattoo reactions. *Clin Exp Dermatol.* 2003;28:508–510.
2. Yazdian-Tehrani H, Shibu MM, Carver NC. Reaction in a red tattoo in the absence of mercury. *Br J Plast Surg.* 2001;54:555–556.
3. Serup J, Hutton Carlsen K. Patch test study of 90 patients with tattoo reactions: negative outcome of allergy patch test to baseline batteries and culprit inks suggests allergen(s) are generated in the skin through haptization. *Contact Dermatitis* 2014;71:255–263.
4. Gaudron S, Ferrier-Le Bouëdec MC, Franck F, et al. Azo pigments and quinacridones induce delayed hypersensitivity in red tattoos. *Contact Dermatitis* 2015;72:97–105.
5. Litak J, Ke MS, Gutierrez MA, et al. Generalized lichenoid reaction from tattoo. *Dermatol Surg.* 2007;33:736–740.