

Pseudolymphomatous and Lichenoid Reaction to a Red Tattoo: A Case Report

Wen En Kuo, MD, MPH; Elizabeth E. Richwine, MD; Daniel J. Sheehan, MD

A pseudolymphomatous reaction is an unusual immune response that can be caused by a tattoo, most commonly by red ink. We present the case of a 40-year-old woman with discolored and pruritic plaques in the areas of red ink tattooed on her right ankle that developed shortly after tattoo application. The patient had 2 other tattoos with red ink for more than 20 years without any disfigurement. Histopathology, immunohistochemistry, and polymerase chain reaction analysis from biopsy of the affected area showed polyclonal pseudolymphomatous and lichenoid reaction, confirming the diagnosis of pseudolymphoma secondary to a tattoo. Total excision of the lesion was performed.

Cutis. 2011;87:89-92.

Case Report

A 40-year-old woman presented with skin irritation of 1 year's duration in areas of red ink tattooed on her right ankle. The tattoo was a red bird with a black outline. Discolored and pruritic plaques developed in the areas with red ink shortly after tattoo application; the plaques had been refractory to topical steroids, intralesional steroids, and oral antibiotics. The patient had 2 other normal tattoos with red, green, and black ink that she received at the same tattoo shop more than 20 years ago. Our patient did not have a remarkable medical history.

Physical examination revealed a healthy woman with a bird tattoo on the lateral side of her right ankle. The area corresponding to the red

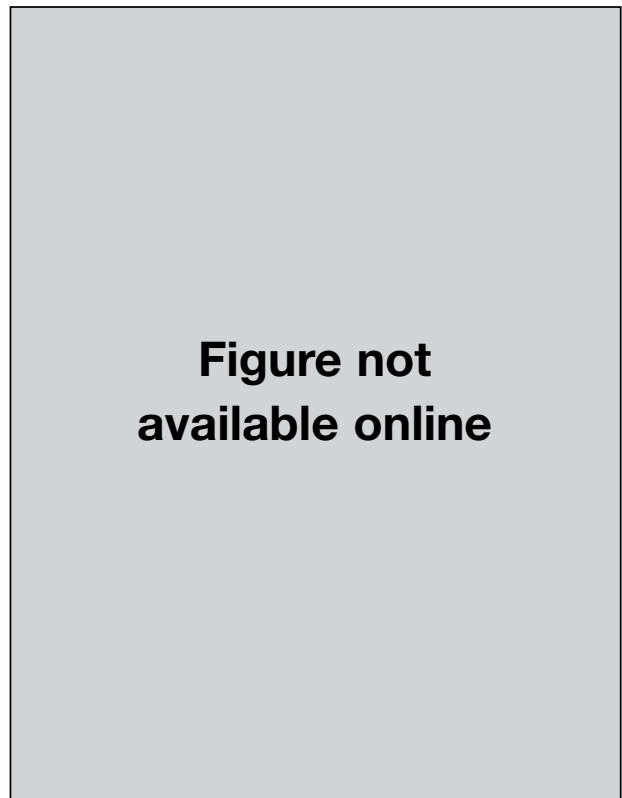


Figure 1. A bird tattoo with black outline on the right ankle with dyspigmented plaques in areas of red ink.

pigment had scarred, dyspigmented, nontender plaques (Figure 1). The black lining of the tattoo appeared normal. Regional lymph nodes were not palpable. The patient's old tattoos were unremarkable on examination.

A punch biopsy was performed and revealed foci of vacuolar interface change; scattered dyskeratotic keratinocytes; aggregates of inflammatory cells in the epidermis; and nodular aggregates of lymphocytes, histiocytes, and plasma cells in the superficial dermis (Figure 2). Clumps of granular black material were noted in the superficial dermis (Figure 3). In

From the Medical College of Georgia School of Medicine, Augusta. Drs. Richwine and Sheehan are from the Department of Medicine, Section of Dermatology.

The authors report no conflict of interest.

Correspondence: Daniel J. Sheehan, MD, Department of Medicine, Section of Dermatology, Medical College of Georgia, 1004 Chafee Ave, Augusta, GA 30912 (dsheehan@mail.mcg.edu).

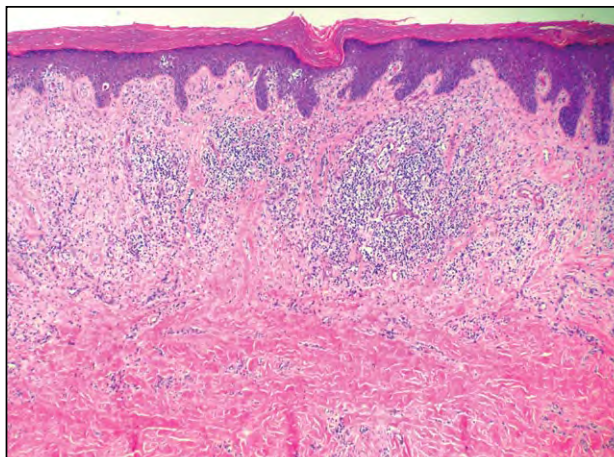


Figure 2. Nodular inflammatory infiltrate in the superficial dermis with scattered histiocytes and plasma cells within the lymphocytic infiltrate (H&E, original magnification $\times 2$).

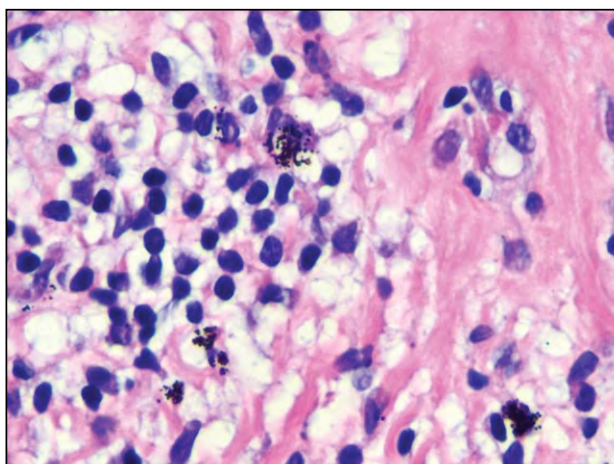


Figure 3. Scattered tattoo pigment and a macrophage engulfed with pigment granules (H&E, original magnification $\times 40$).

addition, aggregates of plasma cells were seen around blood vessels and adnexal structures.

Immunohistochemical stains revealed the inflammatory aggregates consisted of numerous CD1a⁺ and CD4⁺ cells in the dermis (Figure 4). Scattered cells positive for CD68 and CD79a also were noted in the dermal inflammatory aggregates. Furthermore, clonality of the T lymphocytes tested via T-cell receptor- γ polymerase chain reaction analysis did not show presence of clonal T-cell population.

These histopathologic, immunohistochemical, and polymerase chain reaction findings were consistent with a diagnosis of pseudolymphomatous and lichenoid tattoo reaction. With these findings, 2-stage removal of the tattoo was performed by fusiform excisions. The head and body of the bird tattoo

were excised first, and after 2 weeks of recovery, the wings of the bird were removed.

Comment

Complications of tattoos, including infection, hypersensitivity, granulomas, and tumors, occur in approximately 2% of patients. The onset of complications can occur from days to years after receiving the original tattoo.¹ Reactions to tattoos begin with edema and erythema with occasional pain and pruritus; over time they develop into indurated nodules and plaques, masking the original color and appearance of the tattoos.² A lichenoid pattern observed histologically is the most common hypersensitivity reaction to tattoos,^{2,4} often histologically indistinguishable from lichen planus.^{2,4} One report reviewed 18 patients with red tattoo reactions and showed that 13 patients had the histologic pattern of a lichenoid reaction.⁴ Other inflammatory patterns to tattoos include granuloma, hypersensitivity, and sarcoidal reactions.² Tattoo-induced pseudolymphoma, a rare complication from tattoos scarcely reported in the literature, was first described by Okun and Edelstein⁵ in 1976. Pseudolymphoma is a histologic diagnosis of a benign process of reactive hyperplasia of lymphocytes not meeting criteria for malignant lymphoma.^{3,6} The mechanism for the development of tattoo-induced pseudolymphoma is unknown. A proposed mechanism is that the pigment of the tattoo acts as an antigen, which induces the proliferation of lymphocytes, causing the localized reaction that is clinically seen.¹

Our case is an example of both pseudolymphomatous and lichenoid tattoo reaction, with the nodular aggregates of lymphocytes and histiocytes in the superficial dermis and lichenoid infiltrate in the epidermis confined to red areas of the tattoo. In addition, our patient did not report any abnormalities with her 2 other tattoos obtained more than 20 years ago, which contained red, green, and black pigments. According to a PubMed search of articles indexed for MEDLINE using the terms *pseudolymphomatous reaction*, *tattoo*, and *red tattoo*, we found only 1 other case report in the literature describing the development of a reaction after receiving new tattoos in a patient with other tattoos. Chave et al³ reported development of a tattoo reaction on old and new tattoos with retattooing of old tattoos. Red pigment of the old tattoo showed a lichenoid reaction, while light blue pigment on the new tattoo in a distinct site revealed a pseudolymphomatous reaction.³

A pseudolymphomatous reaction to a tattoo can become symptomatic from 3 months to more than 20 years after receiving the tattoo. Symptoms include pain, pruritus, photosensitivity,

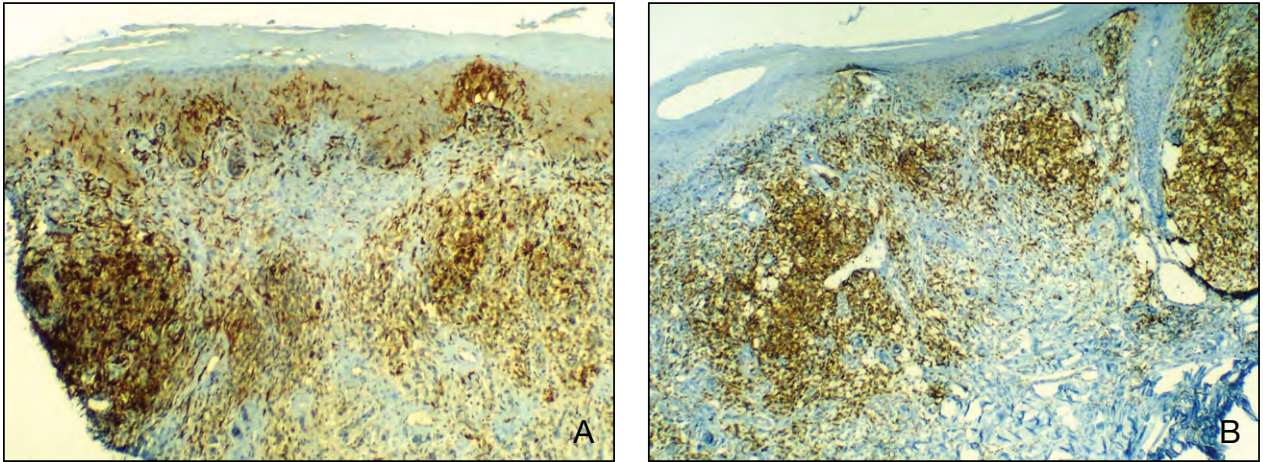


Figure 4. CD1a⁺ (A) and CD4⁺ (B) cells.

and inflammation, while some cases are asymptomatic. All cases, including our patient, have reported a lymphocytic infiltrate with histiocytes and other inflammatory cells. Some of the lymphocytic infiltrates extended through most of the dermis, while others only had a lymphocytic infiltrate in the superficial dermis, similar to our patient.^{3,7-12} Immunohistochemistry was performed in only 3 cases; all 3 showed the lymphocytic infiltrate contained predominately T cells.^{3,9,11}

Pseudolymphomatous reactions to tattoos occur most often with red pigment, which is commonly linked to mercuric sulfide or cinnabar.^{1,7} The highly immunogenic nature of mercury provides the possible explanation for red pigment causing the majority of tattoo-induced pseudolymphomas. Modern alternatives replacing mercuric sulfide for the red pigment include ferric hydrate, cadmium sulfide, and organic vegetable dye.^{4,13} Sensitivity to the alternative red pigments can still occur.¹³ Because of the rapid development of a pseudolymphomatous reaction in our patient with other old tattoos, we believe that the patient's immune system was previously sensitized with the application of old tattoos and triggered a great response with the new tattoo. Patch testing to identify the causative agent in our patient was not performed because of the ineffectiveness of patch tests.⁴ Attempts to contact the tattoo shop regarding composition of the red pigment were not successful.

No reliable and effective treatment of tattoo reactions has been reported. Our patient received unknown topical steroids, intralesional steroids, and oral antibiotics without improvement. Intralesional triamcinolone acetonide in 1 case provided temporary relief of symptoms with multiple recurrence.¹² Another case reported use of clobetasol

ointment 0.05% with flattening of the lesion, more so in the lichenoid nodules than the pseudolymphomatous lesions.³ The CO₂ laser¹⁴ and Q-switched Nd:YAG laser¹⁵ also have been reported to be successful in individual cases. However, 1 case of a pseudolymphomatous reaction successfully treated with the CO₂ laser was associated with leaching of the red pigment onto a wet T-shirt and staining of skin.⁷ In addition, Sanguenza et al¹¹ reported a pseudolymphomatous reaction to a tattoo progressing into a B-cell lymphoma. Our patient is satisfied with the improvement she has seen after serial excision of the involved area.

REFERENCES

1. Kazandjieva J, Tsankov N. Tattoos: dermatological complications. *Clin Dermatol.* 2007;25:375-382.
2. Mortimer NJ, Chave TA, Johnston GA. Red tattoo reactions. *Clin Exp Dermatol.* 2003;28:508-510.
3. Chave TA, Mortimer NJ, Johnston GA. Simultaneous pseudolymphomatous and lichenoid tattoo reactions triggered by re-tattooing. *Clin Exp Dermatol.* 2004;29:197-199.
4. Sowden JM, Byrne JP, Smith AG, et al. Red tattoo reactions: x-ray microanalysis and patch test studies. *Br J Dermatol.* 1991;124:576-580.
5. Okun MR, Edelstein LM. *Gross and Microscopic Pathology of the Skin.* Boston, MA: Dermatopathology Foundation Press; 1976.
6. Ploysangam T, Breneman DL, Mutasim DF. Cutaneous pseudolymphomas. *J Am Acad Dermatol.* 1998;38(6, pt 1):877-895.
7. Bhardwaj SS, Brodell RT, Taylor JS. Red tattoo reactions. *Contact Dermatitis.* 2003;48:236-237.
8. Blumental G, Okun MR, Ponitch JA. Pseudolymphomatous reaction to tattoos. report of three cases. *J Am Acad Dermatol.* 1982;6(4, pt 1):485-488.

Pseudolymphoma Secondary to Tattoo

9. Kahofer P, El Shabrawi-Caelen L, Horn M, et al. Pseudolymphoma occurring in a tattoo. *Eur J Dermatol.* 2003;13:209-212.
10. Muñoz C, Guilabert A, Mascaró JM Jr, et al. An embossed tattoo. *Clin Exp Dermatol.* 2006;31:309-310.
11. Sanguenza OP, Yadav S, White CR Jr, et al. Evolution of B-cell lymphoma from pseudolymphoma. a multidisciplinary approach using histology, immunohistochemistry, and Southern blot analysis. *Am J Dermatopathol.* 1992;14:408-413.
12. Zinberg M, Heilman E, Glickman F. Cutaneous pseudolymphoma resulting from a tattoo. *J Dermatol Surg Oncol.* 1982;8:955-958.
13. Yaidan-Tehrani H, Shibu MM, Carver NC. Reaction in a red tattoo in the absence of mercury. *Br J Plast Surg.* 2001;54:555-556.
14. Kyanko ME, Pontasch MJ, Brodell RT. Red tattoo reactions: treatment with the carbon dioxide laser. *J Dermatol Surg Oncol.* 1989;15:652-656.
15. Hindson C, Foulds I, Cotterill J. Laser therapy of lichenoid tattoo reaction. *Br J Dermatol.* 1995;133:665-666.