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PHOTOCLINIC

Reaction to Red Tattoo Ink in the Setting of Immune Reconstitution Inflammatory Syndrome

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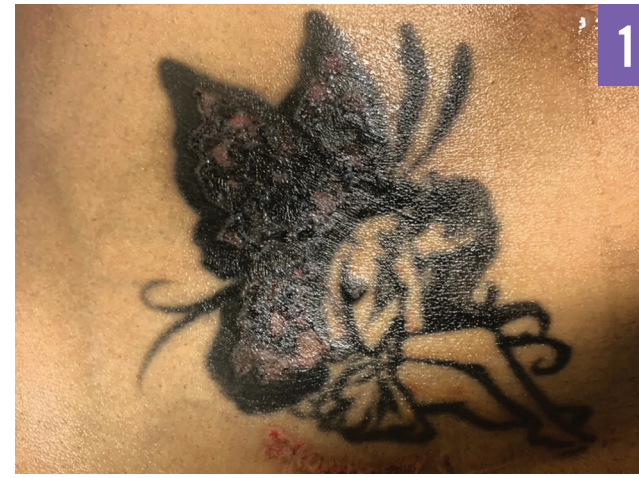
A 50-year-old woman presented to a dermatology clinic with new-onset swelling, pruritus, and discomfort in the areas of red ink within the tattoo on her right lower abdomen, which she had obtained 18 years prior to presentation. Her medical history was notable for systemic lupus erythematosus and HIV, with recent initiation of highly active antiretroviral therapy (HAART) and subsequent rise in CD4 lymphocyte count.

History. The patient had been diagnosed with HIV 26 years prior and had received the tattoo several years after that diagnosis without problems. Throughout the year prior to presentation, the patient had been lost to follow-up and had been off of her antiviral medications, during which time her CD4 lymphocyte count had dropped below 200/mm^3. Four months prior to presentation, HAART medications had been reinitiated, with a significant rise in CD4 lymphocyte count. The patient then noted edema and pruritus of the red ink sites, while the areas of black ink within the same tattoo, as well as the green and purple ink of a separate tattoo on her back, remained unaffected.



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The patient's tattoo with cutaneous reaction in the areas of red ink.

Physical examination. Abdominal examination findings were significant for a fairy-shaped tattoo outlined in black ink with red-inked wings, with edema, peeling, and breakdown of the red color. The nodular texture and appearance of the skin eruption indicated a likely granulomatous reaction. The adjacent skin was erythematous (**Figure 1**). The patient declined a biopsy due to concern for scarring.

At her initial dermatology visit, the patient received intralesional triamcinolone to the affected site and was prescribed a topical corticosteroid, which led to minimal improvement. Despite these treatments, the patient developed recurrent skin peeling and further breakdown at the area of red tattoo ink; thus, referral was made for laser therapy and removal of the tattoo.

To date, the patient has undergone 4 sessions with picosecond laser with 1064 nm to the black ink sites and 532 nm to the red ink sites. The inflammation, erythema, and other symptoms resolved with successful removal of the red ink regions, and the patient is continuing treatment to completely remove the dark ink section without complications (**Figure 2**).

Discussion. Immune reconstitution inflammatory syndrome (IRIS), the paradoxic worsening of inflammatory processes in HIV-infected individuals following the initiation of HAART, allows the immune system to respond to previously ignored

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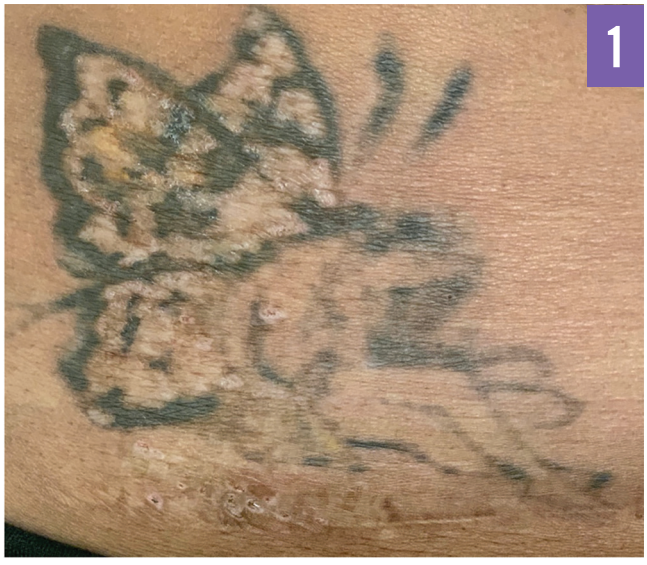

The patient's tattoo after laser therapy.

antigens.[1] IRIS may develop secondary to multiple factors, most notably the extent of CD4 T-cell immune suppression prior to therapy, and the amount of immune recovery that occurs following HAART initiation.[2] IRIS classically develops within a few months following the initiation of HAART, but the presentation and timeline can vary considerably.[3] Some studies have proposed that nearly 30% of patients with low initial CD4 lymphocyte counts who respond to HAART develop an inflammatory syndrome that can be attributed to IRIS.[4,5]

Granulomatous reactions, such as those seen in tattoo pigment reactions, can be a manifestation of IRIS, since CD4 T cells are inflammatory cells integral to granuloma formation.[6] With nearly 30% of the US population reported to have at least one tattoo,[7] and more than 1.2 million Americans living with HIV,[8] tattoo reactions and IRIS are important considerations when initiating HAART. Silvestre and colleagues[9] described a case of cutaneous intolerance to tattoos thought to be a manifestation of IRIS, during which hemorrhagic crust formed within the black ink of a tattoo received 10 years prior, appearing just 2 months following initiation of HAART. Biopsy revealed a granulomatous and eczematous reaction with no microorganisms that eventually cleared with the application of topical betamethasone.[9]

Similar cases of IRIS in the setting of foreign material implanted under the skin have been documented. Farrant and Higgins[3] describe multiple granulomas erupting in a long-standing tribal marking 2 weeks following HAART initiation, suggestive of an exaggerated immune response to the substance used to create the markings. Our patient—with edema, peeling, and breakdown of red color within her tattoo—similarly showed a delayed hypersensitivity reaction and apparent granulomatous formation, likely in the setting of IRIS, since the patient's CD4 lymphocyte count was recovering. Unlike the cases mentioned above, our patient did not recover with topical and intralesional corticosteroids and eventually required laser removal of her tattoo. To our knowledge, there has been no prior documentation of IRIS manifesting as a cutaneous intolerance to red tattoo ink, nor requiring laser therapy for resolution of symptoms.

Red tattoo ink is a common culprit in allergic tattoo reactions, likely attributed to the toxic metals found within the pigment.[10,11] However, our patient's case is highly unusual, because she had no prior reaction to the tattoo pigment, and the problem only developed in the setting of IRIS. Allergic reactions can often be defined by lymphocytic inflammatory infiltrate on pathology, whereas granulomatous reactions are not as commonly associated with allergy.[11,12] Gamba and colleagues[10] described a cutaneous reaction to red ink whereby an allergic reaction was documented at baseline and dramatically worsened following HAART initiation. However, this case was not considered a demonstration of IRIS, since the patient's baseline CD4 lymphocyte count was above 200/mm^3. Additionally, histopathology findings showed dermal red tattoo pigment deposition and an inflammatory infiltrate consisting of lymphocytes and eosinophils, differing from the granulomatous pattern that would be expected in IRIS.[10] In contrast, our patient had a baseline CD4 lymphocyte count below 200/mm^3 and demonstrated the clinical appearance of a granulomatous reaction. Our patient had had her tattoo for 18 years with no prior reactions, indicating the development of a delayed hypersensitivity reaction to a component of red ink in the setting of strengthening immunity with HAART.

This case is a reminder that IRIS, although common in the setting of the immune reaction to infectious processes, is not exclusive to the reactivation of previously latent pathogens. IRIS can present as noninfectious processes such as hypersensitivity reactions to foreign materials and red tattoo ink. Patients who are started on therapy with a CD4 lymphocyte count below 200/mm^3 require close clinical monitoring and should be counseled about the risk of development of IRIS. If symptoms are manageable, clinicians should encourage patients to continue on HAART despite IRIS, since it indicates recovery of the immune system, which is paramount for patients with HIV.[13]

Outcome of the case. Following 4 sessions of picosecond laser therapy, all red ink within the patient's tattoo was successfully removed with resulting resolution of her cutaneous reaction. The patient has remained on HAART and has maintained an acceptable CD4 lymphocyte count without further reaction or evidence of recurrence. The patient will be monitored over time for any recurrence of IRIS, specifically in remaining black, green, and purple ink tattoos that had been previously unaffected. ■

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