

Tattoo reactions in an HIV patient: Autoeczematization and progressive allergic reaction to red ink after antiretroviral therapy initiation

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INTRODUCTION

Complications of tattoos are a growing concern, especially because more than 21% of American adults now have at least 1 tattoo.¹ Overall, few tattoo reactions have been described in HIV patients, and all of the cases reported occurred after antiretroviral therapy (ART) initiation, attributed either to immune reconstitution syndrome (IRS) or leishmaniasis infiltration.²⁻⁷ To our knowledge, there are no reported cases of tattoo reaction in HIV patients not on ART. We describe an HIV patient with an allergic tattoo reaction at baseline that dramatically worsened after ART initiation, which was further complicated by a severe id reaction.

CASE REPORT

A 40-year-old woman with a 7-year history of HIV infection underwent tattooing of 2 red ink “bleeding hearts” on her chest in December 2012. In the days following, erythema and swelling developed at the tattoo sites. She had received multiple prior tattoos without complications, including one on the lower back with red ink. The tattoo eruptions on the chest remained stable over the next 6 months, isolated to the areas of red ink, and did not respond to treatments from urgent care including topical silver sulfadiazine ointment, empiric oral itraconazole, and topical betamethasone dipropionate 0.05% ointment.

In June 2013, the patient presented to the Infectious Disease Clinic for a consultation regarding starting ART, given the tattoo eruption as well as her

Abbreviations used:

ART: antiretroviral therapy
HIV: human immunodeficiency virus
IRS: immune reconstitution syndrome

increasing viral load count and low CD4 cell count. Their examination noted erythema and swelling isolated to the tattoos on her chest. At that visit, her CD4 count was 384 cells per microliter and viral load was 5,940 copies per milliliter. The patient was started on elvitegravir-cobicistat-emtricitabine-tenofovir 150-150-200-300 mg (Stribild; Gilead Sciences, Foster City, CA) tablet once daily, and was referred to dermatology.

The patient was seen in the Dermatology Clinic in August 2013. Her tattoo reactions had worsened after starting ART and were not improving despite application of topical betamethasone dipropionate 0.05% ointment twice daily for more than 4 months. On examination, eroded plaques weeping clear-yellow fluid were isolated to the red portions of her chest tattoos. An allergic reaction to red ink was suspected, and intralesional triamcinolone was injected into both tattoos (a total of 2 mL triamcinolone solution, 10 mg/mL, across both tattoos). Two weeks later, the patient returned with a new generalized pruritic rash and no improvement in her localized tattoo reactions. On examination, she was found to have erythematous papules on her face, trunk, and extremities (Fig 1, B and C). Her chest tattoos remained eroded with clear-yellow

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Fig 1. Allergic reaction to red tattoo ink and autoeczematization. **A**, Edematous, weeping plaques isolated to the red portions of recently acquired “bleeding heart” tattoos on the chest. **B** and **C**, Erythematous, edematous papules on the face and ventral forearms. **D**, New erythematous, crusted plaque within the red portion of a tattoo acquired 17 years prior at a different tattoo parlor.

discharge (Fig 1, A). Her CD4 cell count was 400 and viral load was undetectable, indicating an excellent initial response to ART. She was started on an oral prednisone taper (60 mg by mouth for 4 days, tapered by 10 mg every 4 days, for a total course of 24 days) for presumed allergic tattoo reaction with autoeczematization (id reaction).

The tattoo reactions and generalized papular eruption resolved completely on oral prednisone, but recurred 3 days after the taper was completed in October 2013. In addition, at the time of steroid discontinuation, the patient then had a new allergic reaction within the red portion of her lower back tattoo, whereas the blue, green, and black portions were spared (Fig 1, D). This tattoo had been present for 17 years and had been completed at a different tattoo parlor than her more recent tattoos. At this time, 2 biopsies were performed from the left chest tattoo and sent for histopathology and tissue culture. Histopathology findings showed dermal red tattoo pigment deposition and an extensive associated inflammatory infiltrate consisting primarily of lymphocytes and occasional eosinophils with varying degrees of lichenoid and spongiotic tissue reaction. Bacterial, fungal, and mycobacterial tissue cultures were negative. A second prednisone taper was

commenced, with prednisone 30 mg daily for 2 weeks, followed by 20 mg daily for 8 weeks, while staged surgical excision of the 3 tattoos was completed over 8 weeks beginning in November 2013. Histopathology results from each tattoo excision confirmed the same pathologic findings as in the previous left chest tattoo biopsy (Fig 2, A and B). Tissue cultures from each specimen (bacterial, fungal, and mycobacterial) were also negative. Upon discontinuation of the prednisone after tattoo excision, the generalized papular eruption of her id reaction had not recurred at 2-year follow-up.

DISCUSSION

Red ink reactions are the most frequently described among allergic tattoo reactions. In the past, the proposed culprit in red ink was cinnabar (mercury sulfide), but reactions to red ink continued even as mercury-free inks replaced older mercury-containing inks beginning in the 1970s.^{8,9} Modern red tattoo inks are primarily composed of organic azo pigments.^{10,11} Efforts to identify the specific culprit allergen within these new red inks have been disappointing and suggest that either metabolism or haptenization with host proteins within the dermis is likely required for an allergic

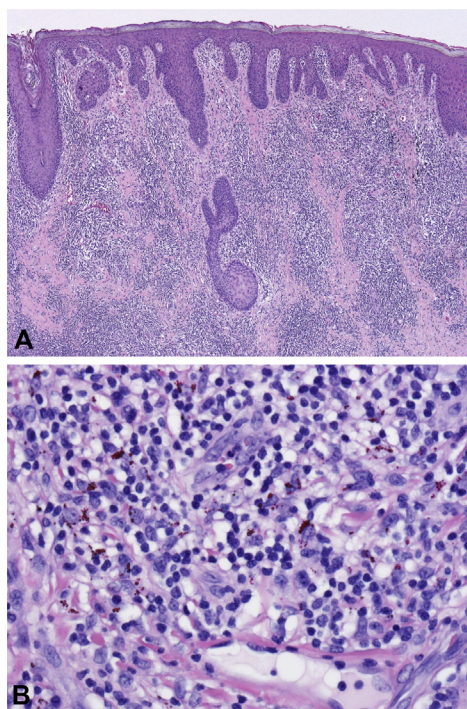


Fig 2. Histopathology from surgical excision of tattoos. **A** and **B**, Dermal red tattoo pigment deposition and an extensive inflammatory infiltrate consisting primarily of lymphocytes and occasional eosinophils with varying degrees of lichenoid and spongiotic tissue reaction.

reaction.^{11,12} These proposed host-ink interactions help explain why patch and prick testing is generally negative in patients with tattoo ink reactions, even when the same ink that was used for the tattoo is applied to the skin. Although intradermal testing may better replicate the reaction, it is largely discouraged given the risk of permanent tattooing and further irreversible allergic reaction.^{10,12} In our patient's case, efforts to contact the tattoo parlor regarding the red ink type were not successful, and patch testing was not undertaken given the aforementioned ineffectiveness.

Selective reactions toward recently acquired versus old tattoos of the same color ink have been described previously.¹³ Kuo et al¹³ described an otherwise healthy woman who had an allergic reaction toward the red ink in a new tattoo, whereas 2 tattoos with red ink from 20 years prior remained uninvolved. All tattoos were completed at the same tattoo shop, although they were unable to confirm the tattoo ink types. The authors suggest that the patient's immune system was sensitized by the old tattoos, leading to a greater response with the new tattoo. It also seems possible that the tattoo inks may have had different components, and thus were not cross-reactive. In contrast to this prior case, our

patient initially reacted only to her new tattoos, but after ART initiation she also developed a reaction to her older tattoo from 17 years prior. Her reaction to this older tattoo was likely secondary to sensitization from the new tattoos, which probably had a shared component in the red ink, and to a promoted immune response in the setting of ART. Another case of delayed tattoo reaction has been described in a T-cell lymphoma patient who reacted to tattoos obtained 20 years prior shortly after his autologous bone marrow transplant¹⁴; presumably, this reaction was also caused by a promoted immune response as in our patient.

Although our patient's pruritic papular eruption was not biopsied, we feel that the appearance of the eruption in the setting of chronic allergic tattoo reaction and enhanced immune reactivity when starting ART makes an id reaction highly likely. Furthermore, the eruption improved simultaneously with the tattoo reactions while on oral corticosteroids and completely resolved with tattoo excision. Another possible etiology for this papular eruption in an HIV patient includes eosinophilic folliculitis, but this generally presents at CD4 cell counts less than 200 and would not rapidly resolve with oral corticosteroids.¹⁵

To date, reactions to tattoos in HIV patients have only been reported after ART initiation, and each presented as a granulomatous reaction that self-resolved within 3 months without significant intervention.²⁻⁴ These cases were considered cutaneous manifestations of IRS, which is a pathologic inflammatory response to a preexisting antigen in HIV patients after starting ART, most commonly a pathogen such as a virus or bacteria. When ART is initiated, HIV viral replication is suppressed and CD4⁺ cells increase in number, restoring pathogen-specific immunity that is generally protective, although in some patients an immunopathologic response may result.¹⁵ Of the aforementioned IRS cases, only one case was a reaction to tattoo ink (black); the other 2 reactions were directed toward traumatic tattoos (a traumatic tattoo generally refers to traumatic implantation of foreign material into the skin). In all 3 of these cases, the reaction involved the entirety of the tattoos. Another tattoo reaction documented in HIV patients is cutaneous tattoo infiltration by leishmaniasis. Initiation of ART preceded the cutaneous symptoms in each of these cases as well,⁵⁻⁷ thus representing another possible manifestation of IRS in HIV.

Our case is unique, as this HIV patient had an allergic reaction to red tattoo pigment before ART, with an amplified, progressive reaction complicated by autoeczematization after ART was initiated.

Notably, our patient's baseline CD4 cell count was not at a level considered consistent with IRS. Also, unlike the aforementioned HIV patients, her reaction lasted 11 months without resolution and had a lichenoid and spongiotic pattern on histopathology rather than a granulomatous pattern. To our knowledge, autoeczematization in the setting of allergic tattoo reaction has not been described previously in any population.

All people are at risk of allergic tattoo reactions. As this case demonstrates, HIV patients may be at increased risk of severe tattoo reactions, particularly in the context of ART initiation. Given the increasing popularity of tattoos, patients should be made aware of the inflammatory risks that tattoo inks pose and that HIV patients may have some unique risk factors for tattoo reactions.

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