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An acute, ulcerative, sarcoidal tattoo reaction following SARS-CoV-2 mRNA-1273 vaccination

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Abstract

Two weeks after her first dose of the SARS-CoV-2 mRNA-1273 (Moderna) vaccine, a 38-year-old woman developed acute-onset pain and ulceration within a tattoo on the distal left leg. Progressive ulceration was noted approximately one week following her second dose of the vaccine. A biopsy revealed sarcoidal granulomas and a dense neutrophilic infiltrate. Ultimately, the final diagnosis of what we have termed a "sarcoidal reaction with a Sweet-like phenomenon" was made; the patient experienced a reduction in pain and re-epithelialization of the ulcers with two weeks of the use of topical clobetasol 0.05% cream twice daily.

Keywords: dermatology, medical, mRNA reactions, sarcoidal, tattoo, vaccines

Case Synopsis

A 38-year-old woman with ulcerative colitis presented to our clinic with acute-onset pain and ulceration within a tattoo on the distal left leg (**Figure 1A**) and multiple, non-tender, firm, subcutaneous pink nodules on the bilateral volar forearms. The lower extremity ulceration and subcutaneous forearm nodules appeared concurrently two weeks after the patient received her first dose of the SARS-CoV-2 mRNA-1273 (Moderna) vaccine. The lower extremity ulceration occurred within a non-professionally inked daisy-shaped tattoo performed 20 years prior. Of note, several years after the original non-professional tattoo, the patient had a professional "cover-up"

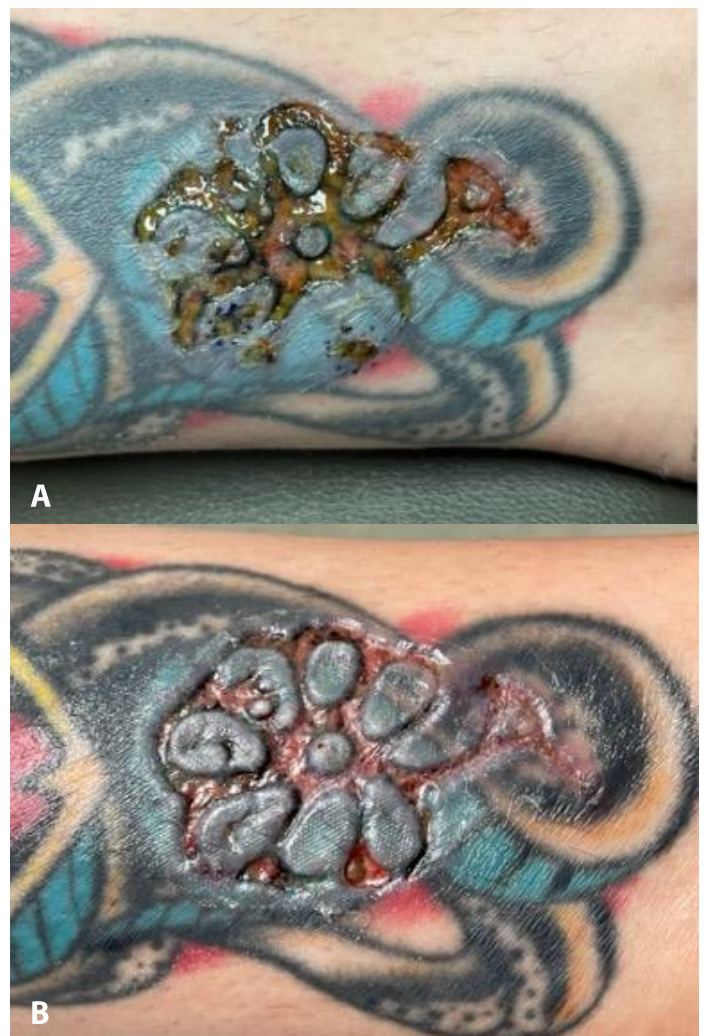


Figure 1. A) Ulceration within a non-professionally inked tattoo performed 20 years prior, two weeks after first SARS-CoV-2 mRNA-1273 (Moderna) vaccination. **B)** Expanding ulceration one week after the second SARS-CoV-2 mRNA-1273 (Moderna) vaccination.

tattoo placed. However, the ulcerations were limited to the original non-professional tattoo. A punch biopsy of the leg ulcer revealed granulomatous

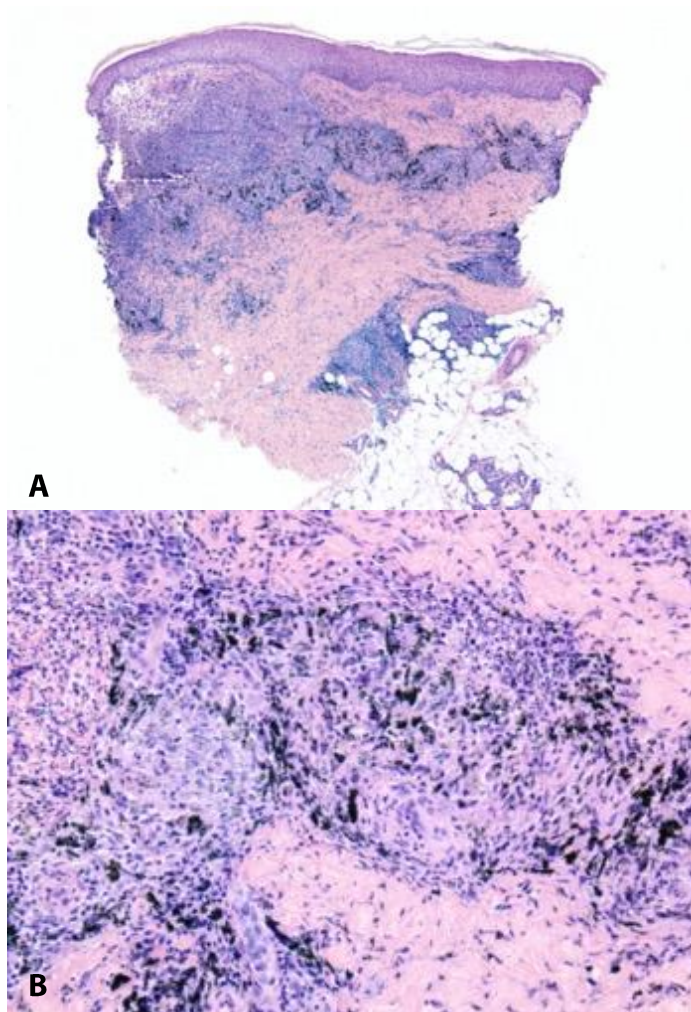


Figure 2. A) Well-formed granulomas centered upon tattoo pigment, and adjacent foci of neutrophilic inflammation. H&E, 4×
B) H&E, 40×.

dermatitis with foci of neutrophilic inflammation adjacent to the granulomas (**Figure 2**). Tissue cultures were negative for bacterial, fungal, and mycobacterial organisms.

Approximately one week following her second dose of the vaccine, the patient noticed progressive ulceration which was still confined to the margins of the non-professional tattoo (**Figure 1B**). A repeat biopsy demonstrated sarcoidal granulomas without a neutrophilic infiltrate. The patient experienced a reduction in pain and re-epithelialization of the ulcer, as well as diminished size of the arm nodules, after two weeks of topical clobetasol 0.05% cream twice daily. A work-up for systemic sarcoidosis, including a complete metabolic panel, angiotensin converting enzyme level, chest X-ray, and ophthalmic examination, was within normal limits.

Our initial differential diagnosis included pyoderma gangrenosum, sarcoidosis, granulomatous tattoo reaction, and atypical mycobacterial infection. The histopathologic findings of a dense neutrophilic infiltrate and sarcoidal granulomas led to the final diagnosis of what we have termed a “sarcoidal reaction with a Sweet-like phenomenon.” Notably, the forearm lesions were not biopsied; we suspect that the etiology was likely a panniculitis (such as erythema nodosum) in the setting of her acute inflammatory sarcoidal reaction.

Case Discussion

The first case of a sarcoidal tattoo reaction was reported in 1939 and subsequently 60 additional cases have been reported in the literature [1]. Although the precise cause is unknown, it has been suggested that tattoo pigmentation may act as a nidus for granuloma formation following activation of the immune system [1]. Successful treatment of sarcoidal tattoo reactions is most commonly achieved with high- or ultra-potent topical or intralesional corticosteroids; other treatment options include antimalarials, allopurinol, and tetracyclines. Sweet syndrome and other neutrophilic dermatoses have been reported in association with sarcoidosis and are thought to portend a good prognosis [2,3].

Our patient likely experienced a robust immune response to her SARS-CoV-2 mRNA-1273 vaccination which led to an ulcerative neutrophilic and sarcoidal tattoo reaction. Although no cases of de novo cutaneous sarcoidosis following COVID-19 vaccinations have been reported to date, a similar phenomenon has been reported following influenza vaccinations in a small cohort of patients [4]. Darrigade et al. reported a case of Sweet syndrome induced by the SARS-CoV-2 BNT1262b2 (Pfizer) vaccination, in which the patient developed diffuse erythematous infiltrated papules one day following vaccination [2]. Though rare, various cutaneous side effects have been reported following COVID-19 vaccinations, such as local injection site reactions, urticarial eruptions, and morbilliform eruptions [5,6]. It is important to note that none of these cutaneous

side effects are reasons for patients to avoid completing their COVID-19 vaccination series [5,6].

Conclusion

We report a case of an acute, ulcerative sarcoidal tattoo reaction, without evidence of systemic

sarcoidosis, likely induced by the SARS-CoV-2 mRNA-1273 vaccination. Our case responded to topical corticosteroids.

Potential conflicts of interest

The authors declare no conflicts of interest.

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