

## LETTERS TO THE EDITOR

# Inflammatory reaction to recently applied red tattoo ink after COVID-19

To the Editor,

A 34-year-old otherwise healthy woman came to the emergency department on May 4, 2022, because of an inflammatory reaction in a recently completed red tattoo. She had other body parts colored with the same red pigment 4 months ago without any adverse event.

She was vaccinated two times during 2021 with mRNA vaccine BNT1262b2 (Corminaty; BioNTech-Pfizer) and got her booster vaccination in December 2021. Nevertheless, she had a COVID-19 Omicron BA1 disease with sore throat and myalgia in late January confirmed by polymerase chain reaction (PCR). Hospitalization was unnecessary.

The last tattoo session was in early February. Inflammatory reactions in the newly applied red tattoo developed about 2 weeks later and continued until May. No other colors had been applied on this occasion.

On examination, we observed an inflammatory, painful reaction with some serous discharge restricted to these areas, where red ink had been injected recently. Older red parts of her tattoo remained

unaffected (Figures 1 and 2). Clinical examination and dermoscopy excluded a lichenoid reaction. The patient refused a diagnostic biopsy. We could not obtain the ink nor a product name or a product leaflet for patch testing.

We prescribed topical betamethasone 2% with fusidinic acid once a day. Three weeks later, the inflammatory reaction had almost been resolved.

It is well known that SARS-CoV-2 vaccination has a reduced effectiveness against the Omicron variants.<sup>1</sup> The present patient acquired SARS-CoV-2 Omicron BA1 after boosting with BNT162b2. Shortly after, she developed an adverse tattoo reaction to red ink.

Adverse reactions to red ink are in general the most common compared to other colors.<sup>2</sup> In the New York City Central Park study, 10.3% of tattooed people reported experiencing an adverse tattoo reaction, and 6.0% suffered from a chronic reaction involving a specific color lasting for more than 4 months. Almost half of color-specific reactions were to red ink.<sup>3</sup>

Our patient suffered from an inflammatory reaction to red ink. Since no diagnostic biopsy was available, we cannot



**FIGURE 1** Granulomatous reaction in recently applied red ink (red arrows) but not in older red tattooed areas (yellow arrow).



**FIGURE 2** Detail of the inflammatory reaction restricted to red colored parts of the tattoo.

TABLE 1 Reported adverse events in and around tattooed body areas in COVID-19 and SARS-Cov-2 vaccination

Sex	Age (Years)	Remarks	Reference
Female	38	Ulcerations and tender nodules in pink tattooed areas on left leg and bilateral volar forearms 2 weeks after first dose of mRNA-1273. Histology: Neutrophilic, granulomatous dermatitis. Treatment: Topical clobetasol 0.05% cream twice daily.	Manci et al. <sup>4</sup>
Female	63	Painful allergic cheilitis with redness, swelling, and tingling 1 month after first dose of BNT1262b2. Histology: None. Treatment: Topical clobetasol 0.05% ointment twice Daily followed by tacrolimus 0.1% ointment twice daily.	Kluger 2022 <sup>5</sup>
Female	25	Granulomatous tattoo reaction and bilateral panuveitis 1 week after second mRNA-1273 vaccination. Histology: Granulomatous inflammation. Treatment: Systemic corticosteroids followed by systemic mycophenolate mofetil.	Lee et al. <sup>6</sup>
Female	42	Lichen striatus close to a pre-existent tattoo in the right forearm that developed 3 days after second dose of BNT1262b2. Histology: Focal lichenoid, perivascular, and peri-ecrine lymphocytic infiltrates, vacuolar interface changes, dyskeratotic keratinocytes. Treatment: Topical tacrolimus 0.1% ointment.	Belina et al. <sup>7</sup>
Unknown	38	Sarcoidal tattoo reaction on the leg after vaccination with mRNA-1273. Histology: Suppurative granulomatous inflammation. Treatment: Not reported.	McMahon et al. <sup>9</sup>
Male	42	Nodules and papules with mild pruritus in black-colored areas within extensive tattoos (arms, legs, back, and chest) one month after mild COVID-19 disease with an extended period of illness. Histology: Superficial and deep sarcoid-like granulomatous dermatitis. Treatment: Systemic corticosteroids followed by Hydroxychloroquine 200mg twice daily, topical intralesional triamcinolone.	Steadman et al. <sup>8</sup>

distinguish between pseudo-lymphoma, sarcoidal, and foreign body granulomatous reaction. Lichenoid reactions have been excluded clinically and by dermoscopy due to absence of lichenoid papules. An allergic reaction would have rather affected all red parts of the tattoo and would not have been limited to the most recent ones.

Sarcoidal and allergic reactions to red ink after vaccination with mRNA vaccines from BioNTech-Pfizer and Moderna (mRNA-1273) had been reported recently (Table 1).<sup>4-9</sup> In the present case, however, infection with SARS-CoV-2 Omicron after three vaccinations with Corminaty was associated with an inflammatory reaction to red tattoo ink. The reaction did not affect those areas treated the year before with the same ink.

The cytokine storm induced by SARS-CoV-2 infection seems to be responsible for the observed adverse event after tattooing. Similar reactions had been reported in HIV-associated immune reconstitution inflammatory syndrome.<sup>10</sup> The common supposed mechanism is an activated monocyte/macrophage pathway.<sup>11</sup> Topical potent corticosteroids are helpful in most cases. We suggest to wait with tattooing at least 8 weeks after vaccination or COVID-19 disease, to reduce the risk of adverse inflammatory reactions, but further investigations are needed.

#### CONFLICT OF INTEREST

None declared.

#### DATA AVAILABILITY TATEMENT

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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