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Erythrodermic psoriasis after COVID-19 vaccination

To the Editor: We read with interest Wei et al’s case series of 7 patients with new or worsening psoriasis following COVID-19 vaccination. Herein, we report a case of erythrodermic psoriasis (EP) following Moderna (mRNA-1273) COVID-19 vaccination.

A 53-year-old male was admitted to the intensive care unit for a full body rash with exfoliation and pruritus. The patient had received the second dose of the Moderna COVID-19 vaccine 4 weeks prior. The patient’s pre-existing plaque psoriasis worsened after the first dose of the Moderna COVID-19 vaccine, with a flare beginning on the neck. Two weeks after the second dose, this rash had spread to the entire body. The patient’s past medical history was notable for a 14-year history of psoriasis that was stable prior to vaccination with daily triamcinolone 0.1% ointment. The patient denied any preceding medication changes or other precipitating factors. Labs were notable for an elevated C-reactive protein. The patient was admitted for 5 days and treated with clobetasol 0.05% ointment daily and oral antihistamines.

Three weeks later, the patient reported mild improvement but continued to endorse significant skin desquamation with pruritus and chills. Physical examination revealed numerous scaly erythematous coalescing plaques on a background of diffuse erythema on the trunk and extremities, palmoplantar

![Fig 1. A, Diffuse coalescing erythematous scaly plaques on the trunk and extremities with distal onycholysis and hyperkeratotic plaques on the soles, 8 weeks after the second dose of the Moderna COVID-19 vaccine. B, Some residual erythema and occasional scattered scaly plaques on the trunk and extremities and hyperkeratotic plaques on the soles after 2 week treatment with triamcinolone 0.1% ointment. C, Marked improvement with distal onycholysis on the bilateral fingernails following 8 week treatment with ixekizumab.](image-url)
keratoderma, and nail plate hyperkeratosis and onycholysis (Fig 1). Estimated body surface area was 95%. A punch biopsy demonstrated superficial epidermal erosion, psoriasiform epidermal hyperplasia, tortuous blood vessels in the papillary dermis, and a mild superficial perivascular lymphocytic infiltrate. Scattered neutrophils and rare eosinophils (arrow) were present in the dermal infiltrate (H&E, 10×; 40×).

Fig 2. Histopathology revealed broad superficial epidermal erosion, psoriasiform epidermal hyperplasia, tortuous blood vessels in the papillary dermis, and a mild superficial perivascular lymphocytic infiltrate. Scattered neutrophils and rare eosinophils (arrow) were present in the dermal infiltrate (H&E, 10×; 40×).

Treatment with triamcinolone 0.1% ointment daily under occlusion for 2 weeks led to marked improvement in scale and erythema. Subsequently, the patient was started on ixekizumab with psoriasis dosing. Eight weeks later, examination revealed few well-demarcated scaly papules and plaques on the bilateral knees with estimated 2% body surface area.

To the best of our knowledge, this is the first reported case of EP following Moderna COVID-19 vaccination. Psoriasis flares following COVID-19 vaccination are rare, with most cases reportedly being either plaque (98.2%) or guttate (1.8%) type. EP following COVID-19 vaccination is more uncommon; Table 1 outlines reported cases. Over one-half of these cases occurred following the Pfizer-BioNTech vaccine, one-half following the second dose, and three-fourths in males. The patient age ranged from 7 to 58 years old. Time to onset of EP following vaccination ranged from 1 day to 7 weeks.

The pathogenesis underlying psoriasis flares following COVID-19 vaccination remains unclear, but proposed mechanisms include activation of immune response following vaccination or vaccination downregulation of angiotensin-converting enzyme 2 causing excessive angiotensin 2 production, which has been associated with psoriasis development. Cases have been reported after non-mRNA COVID-19 vaccines; therefore, the mRNA component is likely not responsible. Other vaccinations have also reportedly caused psoriasis flares, including influenza (H1N1), tetanus-diphtheria, Bacille Calmette-Guerin, and pneumococcal pneumonia.

Although this case adds to the literature on psoriasis flares following COVID-19 vaccination, such cases are uncommon. We encourage clinicians to recommend COVID-19 vaccination in psoriasis patients, in addition to educating patients to monitor for psoriasis flares after vaccination.

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Key words: BioNTech; BNT162b2; ChAdOx1 nCOV-19; CoronaVac; COVID-19; cutaneous; erythroderma; erythrodermic psoriasis; exacerbation; exfoliative dermatitis; flare; Moderna; mRNA-1273; Oxford-AstraZeneca; Pfizer; psoriasis; psoriatic erythroderma; SARS-CoV-2; Sinovac Biotech; vaccine; vaccine reaction; vaccine side effect.

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Conflicts of interest
None disclosed.
# Table I. Erythrodermic psoriasis cases reported following COVID-19 vaccination

| Report            | Age, sex | Vaccine type, dose     | Time from vaccine to EP onset | Immunosuppressive treatment at time of vaccination | Laboratory abnormalities                                                                 | BSA     | Treatment                                                                                   | Treatment duration before clinical improvement |
|-------------------|----------|------------------------|-------------------------------|--------------------------------------------------|-------------------------------------------------------------------------------------------|---------|---------------------------------------------------------------------------------------------|--------------------------------------------------|
| Durmus et al      | 42, M    | BNT162b2, first        | 4 wk                          | Yes, secukinumab                                | Neutrophilia, leukocytosis, elevated serum C-reactive protein                              | 95%     | Oral prednisone and ixekizumab                                                              | 3 wk                                             |
| Nia et al         | 58, M    | BNT162b2, first        | 1 d                           | No                                               | Leukocytosis, mature granulocytosis, thrombocytosis, elevated creatinine                   | NR      | Cyclosporine, ultraviolet B therapy, topical corticosteroids, antihistamines                 | 1 wk, resolution in 3 mo                          |
| Tran et al        | 30, F    | BNT162b2, second       | 1 wk                          | No                                               | Eosinophilia, hypocalcemia                                                                  | >90%    | Acitretin                                                                                    | 2 wk                                             |
| Tran et al        | 45, F    | BNT162b2, second       | 1 wk                          | No                                               | None                                                                                       | 90%     | Topical corticosteroids and antihistamines                                                  | 6 d                                              |
| Lopez et al       | 58, M    | BNT162b2, second       | 1 wk                          | No                                               | Positive hepatitis C vaccine genotype 1a                                                   | >80%    | Secukinumab, symptomatic and supportive therapy including topical corticosteroids and topical vitamin D3 analogs | 2 wk, resolution in 18 wk                         |
| Zhao et al        | 7, M     | CoronaVac, first       | 7 wk                          | No                                               | Hypoproteinemia, liver dysfunction                                                          | >90%    | Secukinumab, symptomatic and supportive therapy including topical corticosteroids and topical vitamin D3 analogs | 2 wk, resolution in 18 wk                         |
| Lin et al         | 54, M    | ChAdOx1 nCoV-19, first | 2 wk                          | Yes, guselkumab                                  | Leukocytosis, elevated serum C-reactive protein                                           | 90%     | Cyclosporine                                                                                 | 4 wk                                             |
| Our case          | 53, M    | mRNA-1273, second      | 4 wk                          | No                                               | Elevated serum C-reactive protein                                                          | 95%     | Topical corticosteroids, antihistamines, and ixekizumab                                      | Mild improvement at 4 wk, significant improvement at 14 wk |

BSA, Body surface area; EP, erythrodermic psoriasis; F, female; kg, kilograms; M, male; mg, milligrams; NR, not reported.

*These patients received mRNA-1273 as the first vaccine dose.
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