Erythrodermic psoriasis after COVID-19 vaccination

To the Editor: We read with interest Wei et al's[1] 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.

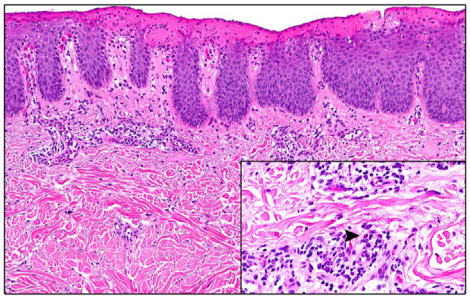

Fig 2. Histopathology revealed broad superficial epidermal erosion, psoriasiform epidermal hyperplasia, tortuous blood vessels in the papillary dermis, and a mild superficial perivascular lymphocytic infiltrate. Scattered neutrophils and rare eosinophils (*arrow*) were present in the dermal infiltrate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

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, consistent with a psoriasiform eruption (Fig 2).

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,[2] with most cases reportedly being either plaque (98.2%) or guttate (1.8%) type.[1] EP following COVID-19 vaccination is more uncommon; Table I outlines reported cases.[3-8] 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.[1,3,8,9] Cases have been reported after non-mRNA COVID-19 vaccines; therefore, the mRNA component is likely not responsible.[7,8] Other vaccinations have also reportedly caused psoriasis flares, including influenza (H1N1), tetanus-diphtheria, Bacille Calmette-Guerin, and pneumococcal pneumonia.[1]

Although this case adds to the literature on psoriasis flares following COVID-19 vaccination, such cases are uncommon.[2] We encourage clinicians to recommend COVID-19 vaccination in psoriasis patients,[10] in addition to educating patients to monitor for psoriasis flares after vaccination.

Nicole Trepanowski, BS,[a] Emily L. Coleman, MD,[a] Gabriella Melson, MD,[b] Candice E. Brem, MD,[b] and Christina S. Lam, MD[a]

From the Department of Dermatology, Boston University School of Medicine, Boston, Massachusetts[a]; and Department of Dermatology, Section of Dermatopathology, Boston University School of Medicine, Boston, Massachusetts.[b]

Funding sources: None.

IRB approval status: Not applicable.

Prior presentation: None.

Patient consent: Consent for the publication of all patient photographs and medical information was provided by the authors at the time of article submission to the journal stating that all patients gave consent for their photographs and medical information to be published in print and online and with the understanding that this information may be publicly available.

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.

Correspondence to: Christina S. Lam, MD, Department of Dermatology, Boston University School of Medicine, 609 Albany St, Boston, MA 02118

E-mail: cslam@bu.edu

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[3]	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[4]	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[5]	30, F	BNT162b2, second*	1 wk	No	Eosinophilia, hypocalcemia	>90%	Acitretin	2 wk
Tran et al[5]	45, F	BNT162b2, second*	1 wk	No	None	90%	NR	NR
Lopez et al[6]	58, M	BNT162b2, second	1 wk	No	Positive hepatitis C vaccine genotype 1a	>80%	Topical corticosteroids and antihistamines	6 d
Zhao et al[7]	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[8]	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.

REFERENCES

1. Wei N, Kresch M, Elbogen E, Lebwohl M. New onset and exacerbation of psoriasis after COVID-19 vaccination. *JAAD Case Rep*. 2022;19:74-77. https://doi.org/10.1016/j.jdcr.2021.11.016
2. McMahon DE, Amerson E, Rosenbach M, et al. Cutaneous reactions reported after Moderna and Pfizer COVID-19 vaccination: a registry-based study of 414 cases. *J Am Acad Dermatol*. 2021;85(1):46-55. https://doi.org/10.1016/j.jaad.2021.03.092
3. Durmus O, Akdogan N, Karadag O, Gokoz O. Erythroderma related with the first dose of Pfizer-BioNTech BNT16B2b2 COVID-19 mRNA vaccine in a patient with psoriasis. *Dermatol Ther*. 2022;35(5):e15363. https://doi.org/10.1111/dth.15363
4. Nia AM, Silva MM, Spaude J, Gonzalez-Fraga JD. Erythrodermic psoriasis eruption associated with SARS-CoV -2 vaccination. *Dermatol Ther*. 2022;35(5):e15363. https://doi.org/10.1111/dth.15380
5. Tran TB, Pham NTU, Phan HN, Nguyen HT. Generalized erythrodermic psoriasis triggered by vaccination against severe acute respiratory syndrome Coronavirus 2. *Dermatol Ther*. 2022;35(6):e15464. https://doi.org/10.1111/dth.15464
6. Lopez ED, Javed N, Upadhyay S, Shekhar R, Sheikh AB. Acute exacerbation of psoriasis after COVID-19 Pfizer vaccination. *Bayl Univ Med Cent Proc*. 2022;35(2):199-201. https://doi.org/10.1080/08998280.2021.2003681
7. Zhao Z, Zhang X, Wang R, Wang Y, Gong L, Li C. Vaccine-induced erythrodermic psoriasis in a child successfully treated with secukinumab: a case report and brief literature review. *Dermatol Ther*. 2022:e15684. https://doi.org/10.1111/dth.15684
8. Lin PT, Chi CC. Erythrodermic psoriasis following ChAdOx1 nCOV-19 vaccination: a case report. *Dermatol Sin*. 2022;40(1):62. https://doi.org/10.4103/ds.ds_11_22
9. ElGhareeb MI, Khater MH, Fakhr A, Khedr HAE. Risk and severity of psoriasis vulgaris in relation to angiotensin II type 1 receptor gene polymorphism and metabolic syndrome. *Clin Cosmet Investig Dermatol*. 2019;12:683-690. https://doi.org/10.2147/CCID.S212781
10. Gelfand JM, Armstrong AW, Bell S, et al. National Psoriasis Foundation COVID-19 Task Force guidance for management of psoriatic disease during the pandemic: version 2—advances in psoriatic disease management, COVID-19 vaccines, and COVID-19 treatments. *J Am Acad Dermatol*. 2021;84(5):1254-1268. https://doi.org/10.1016/j.jaad.2020.12.058

https://doi.org/10.1016/j.jdcr.2022.07.041