

BRIEF ARTICLE

Psoriasiform Spongiotic Dermatitis Drug Eruption following Pfizer-BioNTech SARS-CoV-2 mRNA Vaccine AdministrationKevin H. Nguyen, MS¹, Diem Q. Pham, DO¹, Christof P. Erickson, MD²¹Western University of Health Sciences College of Osteopathic Medicine of the Pacific, Pomona, CA²Compass Dermatopathology, San Diego, CA

ABSTRACT

Introduction: Cutaneous manifestations such as morbilliform rashes, lichen planus, and local injection site patches have been recently published in case reports to occur within days of receiving the coronavirus disease 2019 (COVID-19) vaccine. The most common drug eruptions have been noted to be delayed hypersensitivity reactions.

Objective: To spotlight a vaccine drug eruption case in a patient with a long history of the autoimmune condition, psoriasis vulgaris.

Case Presentation: A 51-year-old Caucasian female presented with pruritic and erythematous rashes covering her back, abdomen, pelvis, and both upper extremities emerging one week after receiving the Pfizer BioNTech mRNA vaccine. The rashes worsened, rapidly spreading toward the lower extremities within five days after her second dose. The patient was diagnosed with psoriasiform spongiotic dermatitis compatible with a drug eruption and began loratadine and clobetasol cream treatment and phototherapy.

Conclusion: With limited published data available on skin reactions to the COVID-19 vaccine, our case report is among one of the first presentations to describe a morbilliform rash induced by a Pfizer BioNTech mRNA drug-eruption. Although this is a rare case, we may expect more reported drug eruptions to be documented as mass vaccinations continue to be dispensed across the globe. Physicians must be prepared to accurately diagnose and treat dermatologic conditions on patients with and without pre-existing illnesses.

INTRODUCTION

Since December 2020, over two billion vaccines have been administered to combat the coronavirus disease 2019 (COVID-19) pandemic.¹ There have been few reports of cutaneous reactions succeeding vaccination. Rice et al reported that localized cutaneous erythema and swelling was commonly observed in the COVID-19 vaccine clinical trials.² Recent case reports have documented the findings of lichen planus,

morbilliform rashes, injection site patches, and radiation recall after COVID-19 vaccine administration.³⁻⁷ Here we present a morbilliform drug eruption akin to the sequelae of the COVID-19 Pfizer-BioNTech SARS-CoV-2 mRNA vaccine.

CASE REPORT

A 51-year-old Caucasian female with a history of hypertension, diabetes mellitus, and psoriasis vulgaris with plaques confined

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to her elbows and knees presented with pruritic and erythematous rashes covering the abdomen, pelvis, back, upper, and lower extremities. The rashes on the proximal upper extremities, abdomen, pelvis, and back appeared one week after receiving the first Pfizer-BioNTech SARS-CoV-2 mRNA and remained unresolved. The rashes spread to the lower extremities five days after the second vaccine which progressively worsened since the onset of one and a half months prior to presentation. The patient endorsed dry skin, itching, and inflammation and denied difficulty swallowing, palpitations, visual disturbance, and coughing. Prior to vaccination, the patient denied a history of any similar skin eruptions. She reported that these lesions were distinct in location and appearance to her history of plaque psoriasis at the elbow and knee regions. The patient denied any other provoking factors at the time of vaccination. A review of systems revealed recent sinus infection.



Figure 1. Pink, scaly papules and plaques on the bilateral lower extremities

Multiple scattered pink scaly papules and plaques were found on the pelvis, back, and abdomen. Furthermore, pink and red, non-scaly, smooth papules and plaques was observed on the bilateral upper and lower extremities (**Figure 1**). A 4 mm punch biopsy on the left flank revealed probable guttate (eruptive) psoriasis infection on the pelvis, abdomen and back. Histology showed slight acanthosis, focal loss of the granular layer, focal mounds of parakeratosis containing rare neutrophils, and a sparse infiltrate of lymphocytes in the upper dermis. Lab blood work and urinalysis remained unremarkable. We attributed the guttate psoriasis to sinusitis, therefore, amoxicillin treatment was prescribed for ten days. However, due to continued flare up, amoxicillin was discontinued within seven days. 10 mg loratadine qam qd, 0.05% clobetasol topical cream bid, 25 mg hydroxyzine HCl prn and mild phototherapy was prescribed for treatment of the rashes on the extremities.

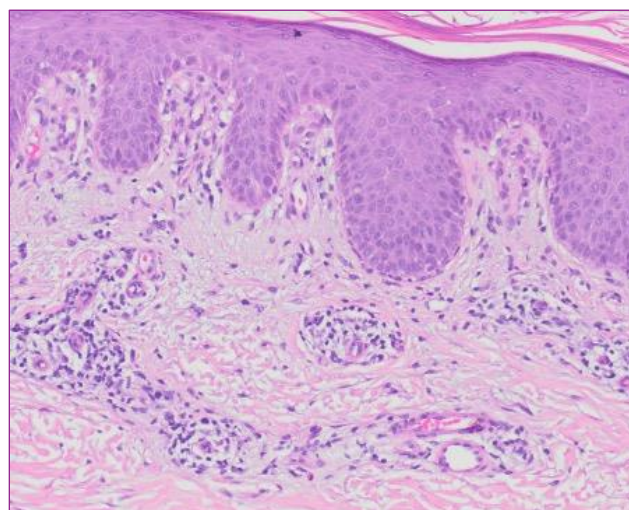


Figure 2. Psoriasiform drug eruption: psoriasiform hyperplasia of the epidermis with suprapapillary thinning, focal diminution of the granular layer, parakeratosis with a few neutrophils, and focal spongiosis. Rare eosinophils were also seen in the dermis (H&E 200X).

During a one-month follow-up, the patient experienced progressive resolution of the rashes, however, lesions on her extremities resurfaced sporadically. A second 4 mm punch biopsy on the right medial thigh favored the diagnosis of psoriasiform spongiotic drug eruption over guttate psoriasis. Histology revealed psoriasiform hyperplasia of the epidermis with suprapapillary thinning, focal diminution of the granular layer, parakeratosis with a few neutrophils, and focal spongiosis (**Figure 2**). A lymphohistiocytic infiltrate with rare eosinophils was present in the upper dermis. The patient reported clearance of the rashes and decreased pruritus (**Figure 3**). Still, 10 mg loratadine qam qd and 0.05% clobetasol cream prn bid was continued. Hydroxyzine was discontinued due to drowsiness. No flare ups have occurred since the initial treatment was introduced, and the patient is recovering gradually. Upon a one-year follow-up visit, the patient denied any recent exacerbating episodes. She has discontinued loratadine and clobetasol cream and has begun using a combined calcipotriene and betamethasone dipropionate foam topical for her plaque psoriasis which was still limited to the elbow and knee regions. Overall, the patient is doing well and did not report any new skin eruptions.



Figure 3. Improvement and clearing of rashes following phototherapy, loratadine, and clobetasol.

DISCUSSION

Prior to her presentation at the clinic, the patient reported that she had not been followed by a dermatologist within the past 10 years due to her lesions being well-controlled. She stated that throughout her 17-year history of psoriasis, the plaques were controlled with topical fluticasone prescribed by her primary care physician. She reported chronic plaque psoriasis isolated at the elbows and knees throughout her clinical history. Although constantly present, the patient denied any exacerbating factors or episodes of uncontrollable eruptions. However, she stated that the plaque psoriasis predictably presented each year with more scale throughout the winter season

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while having mild resolution during the summer and when exposed to water. The skin lesions that appeared after vaccination did not resemble her plaque psoriasis with respect to the location of occurrence or appearance.

The differential diagnosis included guttate psoriasis, drug eruption, and allergic contact dermatitis. Despite discontinuing all unnecessary medications, rashes remained unresolved. A biopsy of the left flank which revealed pink, scaly plaques and papules, confirmed guttate psoriasis as the cause of the lesions on the pelvis, back, and abdomen. Despite amoxicillin treatment, more lesions developed, thus, it was discontinued within seven days of use. Nevertheless, an infection causing guttate psoriasis co-occurring with the drug eruption is noteworthy to consider.

Morbilliform rashes are common in hypersensitivity reactions that occur three days to three weeks after drug administration.⁸ Likewise, there was both a seven and five-day delay in rash appearance after the injection of the first and second doses of the Pfizer-BioNTech SARS-CoV-2 mRNA vaccine, respectively. The exacerbation and expansion of pink and red, non-scaly, papules and plaques on the lower extremities ensuing the second dose reaffirmed a delayed immune response. Furthermore, the patient's histopathology taken from the right medial thigh revealed focal spongiosis, eosinophils at the dermis, and lymphohistiocytic infiltrate consistent with drug exanthem biopsies observed in the literature.⁹

Few reports of morbilliform drug eruptions have been documented after vaccination. Jedlowski and Jedlowski presented an initial erythematous morbilliform rash drug eruption at the lower back appearing forty-eight hours

after Pfizer BioNTech COVID-19 vaccine administration.⁴ The eruption expanded, covering the proximal extremities after the second dose.⁴ However, the lesions were described as macular, with appearance of papules and plaques, unlike our patient. Recently reported morbilliform rashes have resolved without any necessary treatment.^{4,5} Our patient's history of psoriasis vulgaris presented a clinical challenge for management and care. Prednisone is the conventional treatment for drug eruptions; however, our patient's compromised immunity made this option unfeasible as it would lead to pustular psoriasis development and induce hospitalization. Proper treatment was attributed to the use of loratadine, an antihistamine and clobetasol steroid treatment.

McMahon and colleague's survey revealed that delayed large local eruptions, local injection site reactions, urticaria, and morbilliform eruptions were most commonly reported after receiving the Moderna and Pfizer vaccines.¹⁰ Similar to SARS-CoV-2 mRNA vaccination, morbilliform rashes have been reported to be spotted subsequent to infection.¹¹ SARS-CoV-2 enters cells through angiotensin-converting enzyme 2 (ACE2) which is expressed in skin.¹² Thus, it may be reasonable to speculate that SARS-CoV-2 can cause eruptions such as erythema, urticaria, and vesicle formation.⁸

CONCLUSION

Since the start of the COVID-19 pandemic, few reports discuss the proper treatment of vaccine-induced skin rashes. Providers and dermatologists must be prepared to offer alternative treatment when traditional options are contraindicated in immunocompromised patients. As more vaccines become distributed around the world, further evidence

will emerge to specify proper treatment protocols for drug eruptions secondary to vaccine administration. This case report calls forth the importance of more studies being conducted in larger sample studies for better characterization of skin reactions caused by the COVID-19 vaccine.

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