

Severe nonanaphylactic allergic reaction to the Pfizer-BioNTech COVID-19 vaccine



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INTRODUCTION

The Pfizer-BioNTech COVID-19 vaccine was first approved for use in December 2020. Studies have shown the vaccine to be highly effective at preventing transmission of SARS-CoV-2 and reducing the severity of COVID-19.¹ Reported side effects of the vaccine include injection-site pain, mild-to-moderate fatigue, mild-to-moderate headache, and, more rarely, anaphylaxis and nonanaphylactic allergic reactions.² Here, we describe a severe nonanaphylactic allergic reaction to the Pfizer-BioNTech COVID-19 vaccine in a patient with no significant history of atopy.

CASE REPORT

A 36-year-old woman developed a pruritic, painful rash on her arms, forearms, face, scalp, and back of her neck 3 hours after receiving the first dose of the Pfizer-BioNTech COVID-19 vaccine injected into the right deltoid. The rash persisted, and the patient's eyelids began swelling 4 days later. The patient took several 10-mg doses of loratadine but did not notice significant improvement.

Upon presentation to the dermatology clinic, 8 days after vaccination, clinical evaluation revealed severe facial edema and edematous eyelids nearly swollen shut (Fig 1). In addition, there was marked erythema and superficial desquamation of the face, ears, and neck with scattered morbilliform edematous pink papules on the chest, upper portion of the back, and both arms (Fig 2, A-C). The patient did not have fever, shortness of breath, dyspnea, cough, mucosal swelling, nor other systemic symptoms. Laboratory findings, including complete blood count, comprehensive metabolic panel, and C4 complement, were within the normal limits,



Fig 1. Patient demonstrating marked facial edema with edematous eyelids with erythema and superficial desquamation.

including no peripheral eosinophilia or transaminitis. The patient's edema responded immediately to a prednisone taper, continuing loratadine, and topical triamcinolone ointment. The rash resolved within 5 days. The reaction was reported to the Vaccine adverse event reporting system.

The patient had no previous history of adverse reaction to vaccinations, and her only dermatologic history was a brief episode of pityriasis rosea 4 years previously. The patient also did not have any history of dermal filler injections. Prick allergy testing for postnasal drip 20 years prior was negative. The patient was 8 months postpartum and breastfeeding

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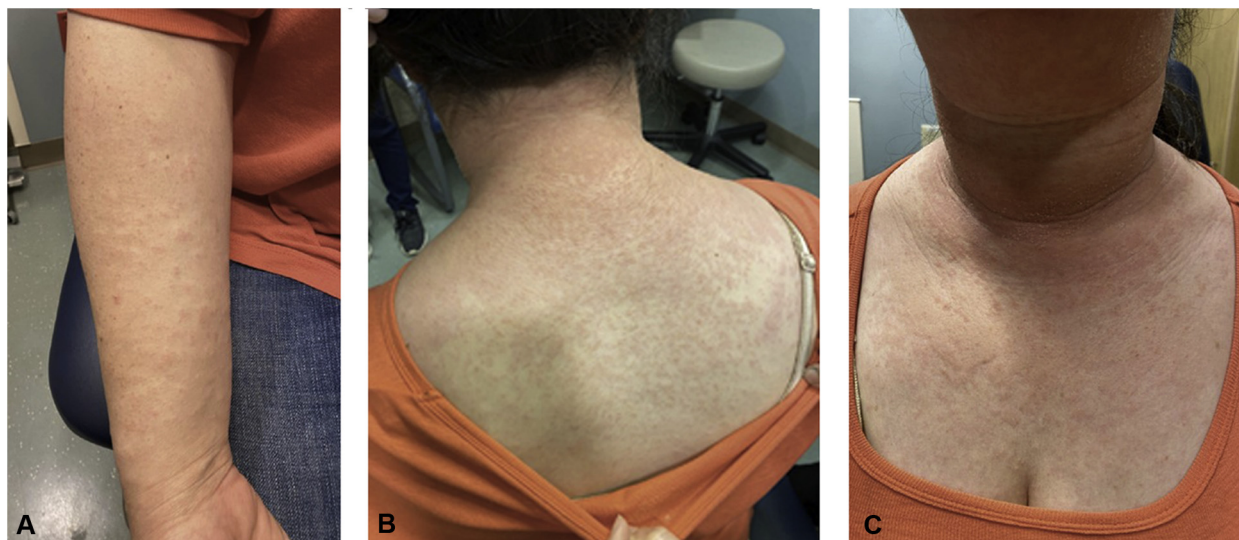


Fig 2. Scattered morbilliform edematous, pink papules on the (A) forearm, (B) back of the neck, and (C) chest.

multiple times daily at the time of vaccination. The patient was advised by Allergy to avoid the second dose of the vaccine and is well without other sequelae now 6 months since presentation.

DISCUSSION

This 36-year-old woman developed a severe, nonanaphylactic allergic reaction to the Pfizer-BioNTech COVID-19 vaccine. The patient developed an itchy rash within hours of receiving the vaccine. On postvaccination day 8, the patient's rash had spread and desquamated. She had also developed severe facial edema several days after vaccination.

Allergic reactions to the Pfizer-BioNTech COVID-19 vaccine are rare. Among the first 1.9 million Pfizer doses, there were 83 reported cases of nonanaphylactic allergic reaction.³ A recent study of cutaneous reactions to the Pfizer vaccine found injection-site reaction and urticaria to be the most common findings after the first dose. Morbilliform rashes were noted in several cases, but angioedema was not reported.⁴ A variety of other skin reactions after COVID-19 vaccination have been reported, including delayed injection-site reaction ('COVID-arm'),⁵ small-vessel vasculitis,⁶ pityriasis-like eruptions,⁷ and other nonspecific drug reactions.⁸ In addition, patients with a history of dermal filler injection may be at risk of developing facial swelling.⁹

To date, no specific etiology of cutaneous allergic reaction to the COVID-19 vaccine has been identified, although polyethylene glycol and polyethylene glycol derivatives have been suggested to be

involved.¹⁰ The patient was breastfeeding at the time of the reaction; however, there is no evidence that breast-feeding women are at higher risk for negative side effects of the vaccine.¹¹ In this patient's case, it is difficult to pinpoint a specific cause, considering her lack of previous reaction to vaccines.

This case report of a nonanaphylactic, morbilliform, cutaneous reaction to the Pfizer-BioNTech COVID-19 vaccine adds to the limited medical literature on cutaneous adverse reactions to COVID-19 vaccination and illustrates that even in patients with no previous history of atopy or adverse vaccination events, dermatologic reactions can occur and progress for days after vaccination. The cutaneous reaction had 2 phases; an early morbilliform rash within a few hours, followed by edema with superficial desquamation of the face, with more widespread involvement of the trunk and extremities a few days later. Given the timing of the rash, including persistence of individual lesions beyond 24 hours, and more extensive cutaneous manifestations occurring with delayed onset, this may represent a type IV delayed-type hypersensitivity rather than an urticarial mechanism. Despite the severity of the nonanaphylactic cutaneous manifestation in this case, the patient responded dramatically to a short course of systemic steroids.

Conflicts of interest

None disclosed.

REFERENCES

1. He Q, Mao Q, Zhang J, et al. COVID-19 vaccines: Current understanding on immunogenicity, safety, and further

- considerations. *Front Immunol.* 2021;12:1196-1209. <https://doi.org/10.3389/fimmu.2021.669339>
- Polack FP, Thomas SJ, Kitchin N, et al. Safety and efficacy of the BNT162b2 mRNA COVID-19 vaccine. *N Engl J Med.* 2020;383(27):2603-2615.
 - CDC COVID-19 Response Team; Food and Drug Administration. Allergic reactions including anaphylaxis after receipt of the first dose of Pfizer-BioNTech COVID-19 vaccine—United States, December 14–23, 2020. *MMWR Morb Mortal Wkly Rep.* 2021;70(2):46-51. <https://doi.org/10.15585/mmwr.mm7002e1>
 - 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>
 - Fernandez-Nieto D, Hammerle J, Fernandez-Escribano M, et al. Skin manifestations of the BNT162b2 mRNA COVID-19 vaccine in healthcare workers. 'COVID-arm': a clinical and histological characterization. *J Eur Acad Dermatol Venereol.* 2021;35(7):e425-e427. <https://doi.org/10.1111/jdv.17250>
 - Kharkar V, Vishwanath T, Mahajan S, Joshi R, Gole P. Asymmetrical cutaneous vasculitis following COVID-19 vaccination with unusual eosinophil preponderance. *Clin Exp Dermatol.* 2021;46(8):1596-1597. <https://doi.org/10.1111/ced.14797>
 - Cyrenne BM, Al-Mohammed F, DeKoven JG, Alhusayen R. Pityriasis rosea-like eruptions following vaccination with BNT162b2 mRNA COVID-19 vaccine. *J Eur Acad Dermatol Venereol.* 2021;35(9):e546-e548. <https://doi.org/10.1111/jdv.17342>
 - Lam M, Egail M, Bedlow AJ, Tso S. Ribonucleic acid COVID-19 vaccine-associated cutaneous adverse drug events: a case series of two patients. *Clin Exp Dermatol.* 2021;46(6):1131-1134. <https://doi.org/10.1111/ced.14673>
 - Rice SM, Ferree SD, Mesinkovska NA, Kouros AS. The art of prevention: COVID-19 vaccine preparedness for the dermatologist. *Int J Womens Dermatol.* 2021;7(2):209-212. <https://doi.org/10.1016/j.ijwd.2021.01.007>
 - Cabanillas B, Novak N. Allergy to COVID-19 vaccines: a current update. *Allergol Int.* 2021;70(3):313-318. <https://doi.org/10.1016/j.alit.2021.04.003>
 - Blumberg D, Sridhar A, Lakshminrusimha S, Higgins RD, Saade G. COVID-19 vaccine considerations during pregnancy and lactation. *Am J Perinatol.* 2021;38(6):523-528. <https://doi.org/10.1055/s-0041-1726390>