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Severe Non-anaphylactic Allergic Reaction to the Pfizer-BioNTech COVID-19 vaccine**Authors:**Hayden Doughty BS¹Dorothea Barton MD²**Affiliations:**¹ Geisel School of Medicine at Dartmouth

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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 COVID-19 transmission and severity of illness.¹ Reported side effects of the vaccine include injection site pain, mild-to-moderate fatigue, mild-to-moderate headache, and more rarely, anaphylaxis and non-anaphylactic allergic reactions.² Here, we describe a severe non-anaphylactic allergic reaction to the Pfizer-BioNTech COVID-19 vaccine in a patient without a significant history of atopy.

Case Report

A 36-year-old female developed a pruritic, painful rash on her arms, forearms, face, scalp, and back of neck three 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 four days later. The patient took several doses of loratadine 10mg but did not notice significant improvement.

Upon presentation to the dermatology clinic, eight days after vaccination, clinical evaluation revealed severe facial edema and edematous eyelids nearly swollen shut (Figure 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 back, and bilateral arms (Figures 2 A, B, and 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, C4 complement were within normal limits, 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

46 within five days. The reaction was reported to the Vaccine Adverse Event Reporting System
47 (VAERS).



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49 **Figure 1.** Patient demonstrating marked facial edema with edematous eyelids with erythema and
50 superficial desquamation.



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

The patient has no previous history of adverse reaction to vaccinations and her only dermatologic history was a brief episode of pityriasis rosea four years prior. The patient also did not have any history of dermal filler injections. Prick allergy testing for post-nasal drip twenty years prior was negative. The patient was eight months post-partum and breastfeeding 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 six months since presentation.

Discussion

This 36-year-old female developed a severe, non-anaphylactic allergic reaction to the Pfizer-BioNTech COVID-19 vaccine. The patient developed an itchy rash within hours of receiving the vaccine. On post-vaccination day eight, 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 non-anaphylaxis 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 non-specific drug reactions.⁸ In addition, patients with a history of dermal filler injection may be at risk for facial swelling.⁹

To date, no specific etiology for cutaneous allergic reaction to the COVID-19 vaccine has been identified, although polyethylene glycol (PEG) and PEG derivatives have been suggested.¹⁰ The

patient was breastfeeding at the time of the reaction; however, there is no evidence that breastfeeding 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 non-anaphylactic, 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 without a previous history of atopy or adverse vaccination events, dermatologic reactions can occur and progress for days after vaccination. The cutaneous reaction had two phases, an early morbilliform rash within a few hours, followed by edema with superficial desquamation of the face, and 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 non-anaphylactic cutaneous manifestation in this case, the patient responded dramatically to a short course of systemic steroids.

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