Received: 26 January 2022 | Accepted: 10 April 2022

DOI: 10.1111/pde.15019

Pediatric Dermatology WILEY

BRIEF REPORT

Eosinophilic cellulitis in response to BNT162b2 COVID-19 vaccination

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Funding information
DE is supported by a Dermatology Foundation Career Development Award.

Abstract

A 12-year-old boy presented with a 2-week history of persistent pruritic edematous plaques one day after he received the first dose of the BNT162b2 COVID-19 mRNA vaccine. A skin biopsy showed urticarial dermatitis with tissue eosinophilia consistent with a diagnosis of vaccine-associated eosinophilic cellulitis, with polyethylene glycol as a potential trigger.

KEYWORDS
COVID-19, hypersensitivity, messenger RNA, pediatrics, vaccination

A 12-year-old boy with a history of asthma, urticaria, and peanut allergy presented with a 2-week history of a pruritic rash, developing one day after the first dose of BNT162b2 COVID-19 mRNA vaccine. On exam, there were seven arcuate and annular pink edematous plaques measuring 3–12 cm distributed on his face, neck, torso, and bilateral upper extremities. The largest plaque, covering the lower back, had an annular, indurated peau d' orange appearance (Figure 1). The lesions were fixed, lasting several days. He denied joint pains, fatigue, oral ulceration, or weight loss. At presentation, temperature was 38.4°C. Laboratory tests showed leukocytosis (13,200/μl) with neutrophil predominance (9240/μl) without peripheral eosinophilia, elevated CRP (2.90 mg/dl), elevated ESR (31 mm/hr), weakly positive ANA (1:80), and normal urinalysis. Punch biopsy of the lower back plaque showed mild spongiosis, focal dermal edema and acute and chronic perivascular and periadnexal mixed, but eosinophil-predominant, inflammation, without evidence of mucin. This was diagnosed as urticarial dermatitis with tissue eosinophilia compatible with Wells syndrome.

Two weeks later, his pruritus and skin lesions had improved, but not resolved. Therefore, cetirizine was increased to 10 mg twice a day and triamcinolone 0.1% ointment twice a day was prescribed. Two weeks later, his condition had completely resolved.

Eosinophilic cellulitis, or Wells syndrome, is a rare inflammatory dermatitis infrequently reported in children, presenting with sudden onset of single or multiple intermittent and pruritic erythematous plaques resembling urticaria or cellulitis, usually symmetrically distributed on the torso and extremities. It has a protean presentation and is often misdiagnosed and treated as a bacterial cellulitis. The lesions may progress to indurated plaques.[1] Rarely, vesicles, bulla and nodules have been reported.[1] Wells syndrome is thought to be a hypersensitivity reaction mediated by CD4+ T-cells to antigens.[1] Common triggers include infection, arthropod bites, vaccinations, hematological and myeloproliferative disease and malignancy.[1] In children, the most commonly reported triggers are vaccinations.[1,2]

The only identifiable trigger in this case was the BNT162b2 COVID-19 mRNA vaccine, administered one day prior to onset of the rash. Seven other cases of vaccine-triggered Wells syndrome have been reported with thimerosal, neomycin and aluminum hydroxide as the purported antigens.[1,2] Neither the mRNA-1273 (Moderna) nor BNT162b2 (Pfizer-BioNTech) COVID-19 mRNA vaccines contain those ingredients.[3] Of the ingredients listed, polyethylene glycol is the only one with reported hypersensitivity reactions[3,4] suggesting that our patient may have experienced a hypersensitivity reaction to polyethylene glycol, a known antigenic trigger in the new mRNA vaccines. Polyethylene glycol is used as an excipient for many medicinal products and is not an ingredient in other non-mRNA vaccines.[4] Our patient is up to date on his vaccinations and prior to receiving the BNT162b2 COVID-19 mRNA vaccine had not experienced a similar rash. Wells syndrome is not life-threatening and pre-treatment with antihistamines can be considered prior to exposure to known antigens.[2]

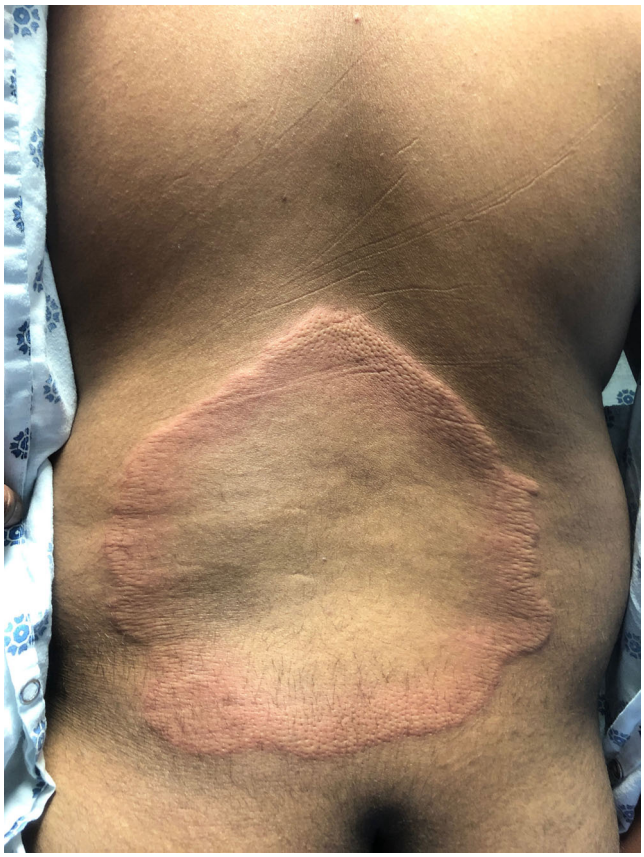

FIGURE 1 Large annular pink indurated plaque with a peau d' orange appearance on lower back

Lesions of Wells syndrome usually heal within 6 weeks without scarring but can recur especially if exposed to the same immunologic trigger.[2] In addition to avoiding known triggers, first-line treatment is topical steroids with or without a short course of systemic corticosteroids, 2 mg/kg/day for 1–2 weeks then tapered over 2–3 weeks.[5]

CONFLICT OF INTEREST

The authors have indicated they have no conflicts of interest relevant to this article to disclose.

CONSENT STATEMENT

Written and verbal consent for the use of photographs was obtained from the patient's guardians.

DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon reasonable request.

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How to cite this article: Ikediobi O, Eichenfield DZ, Barrio VR. Eosinophilic cellulitis in response to BNT162b2 COVID-19 vaccination. *Pediatr Dermatol*. 2022;1-2. doi:10.1111/pde.15019