

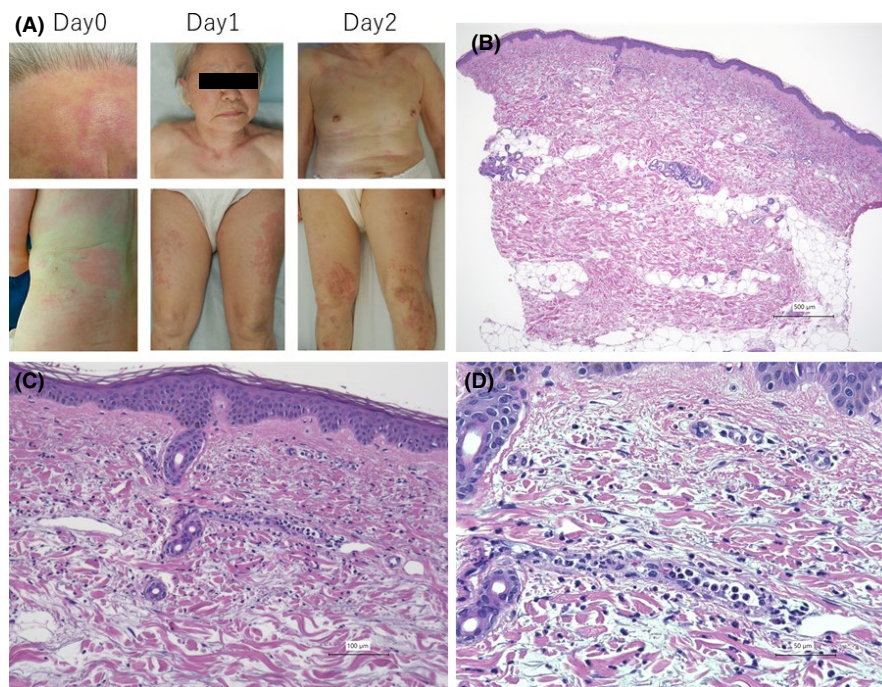
## CORRESPONDENCE

## Neutrophilic urticarial dermatosis following BNT162b2 (Pfizer–BioNTech) COVID-19 vaccination

Dear Editor,

Many people around the world have received the COVID-19 vaccination and cutaneous reactions, for example, delayed significant local reaction, local injection site reaction, urticarial eruption, and morbilliform eruption, are widely reported. While cutaneous reactions to the vaccine are generally minor and self-limited, we report a patient with neutrophilic urticarial dermatosis following COVID-19 vaccination who required high-dose steroid treatment. An 86-year-old woman was brought to our hospital by emergency transport due to difficulty moving, fever, and nonpruritic urticarial patches and plaques on her whole body (Figure 1A Day 0). Within 5 h of receiving the first dose of the COVID-19 vaccine (BNT162b2),

she noticed erythema on her neck and lower limbs (Day-4). Several days later, the eruption became widespread, involving her face, arms, chest, and back. Individual lesions did not resolve after several hours. She fell and was unable to get up, prompting her son to call an ambulance. Her vital signs were normal, and she had no breathing difficulties. Blood tests revealed a high C-reactive protein level (6.9 mg/dl) and a high white blood cell count (22,300/ $\mu$ l) with neutrophilia (86.8%). Methylprednisolone (125 mg) was administered by intravenous drip. On Day 1, the erythema on her face, ears, and trunk improved, but erythematous plaque persisted on her thighs (Figure 1A Day 1). The skin lesions were clinically diagnosed as erythema multiforme. Oral prednisolone (25 mg/day, 0.5 mg/kg/day)



**FIGURE 1** (A) Clinical features. Day 0: Nonpruritic urticarial patches and plaques were observed on the face, ears, trunk, upper limbs, and thighs. Day 1: While the erythema on her face, ears, and trunk improved, persistent erythematous plaque remained on her thighs. Day 2: Plaque on her thighs was not resolved within a few hours, but disappeared within 24 hours. New lesions developed on her trunk and knees. (B, C, D) Pathologic findings. Pathologic analysis of a skin biopsy sample obtained from an erythematous lesion on her thigh (Day1). A scale bar is indicated in each figure. (B, C) Infiltration of inflammatory cells was observed in the upper dermis. (D) Neutrophils diffusely infiltrated into the dermis with leukocytoclasia. Neither vasculitis nor liquefaction was observed

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was started. On Day 2, the plaque on her thighs disappeared within 24 h of onset, but new erythematous lesions appeared on her trunk and knees (Figure 1A Day 2) accompanied by a high fever (38.7°C). The dose of prednisolone was increased to 50 mg/day (1 mg/kg/day). Pathologic analysis of a skin biopsy sample obtained from an erythematous lesion on her thigh (Figure 1A Day 1) revealed infiltration of inflammatory cells (Figure 1B,C) and diffuse neutrophil infiltration with nuclear dust (Figure 1D) in the dermis. Neither vasculitis nor liquefaction was observed. She was diagnosed with neutrophilic urticarial dermatosis. On Day 3, the erythema and fever disappeared. On Day 19, the prednisolone was tapered off.

Neutrophilic urticarial dermatosis is a rare disease. Edematous erythema, clinically similar to urticaria, recurs in 24–48 h, with fever and arthritis. It may be associated with systemic lupus erythematosus and adult-onset Still's disease.<sup>1</sup> Neutrophilic urticarial dermatosis after COVID-19 vaccination has not yet been reported. Shimabukuro<sup>2</sup> reported that the frequency of anaphylaxis with BNT162b2 is 11.1 cases per million. Urticaria was observed in 18 of 74 patients presenting with cutaneous reactions due to BNT162b2.<sup>3</sup> Of 18 people presenting with urticaria after the first vaccination, only four developed urticaria after the second vaccination.<sup>3</sup> In this case, she developed erythema within 5 h of receiving the COVID-19 vaccine (BNT162b2). This might be a late phase reaction by recruiting neutrophils. It is important to keep in mind that cutaneous reactions associated with the COVID-19 vaccination, although usually mild, may be severe. Further accumulation of similar cases will help to elucidate the underlying mechanisms of neutrophilic urticarial dermatosis.

#### DECLARATION SECTION

Approval of the research protocol: N/A.


Informed Consent: Obtained from the patient.

Registry and the Registration No. of the study/trial: N/A.

Animal Studies: N/A.

#### CONFLICT OF INTEREST

The authors declare no conflict of interest.

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