

Correspondence

Eosinophilic pustular folliculitis developing at the site of COVID-19 vaccination

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Dear Editor,

A 38-year-old Japanese woman presented with scattered itchy folliculocentric papules on her left upper arm (Fig. 1a). There were no eruptions at other sites, and no systemic symptoms, including fatigue or fever. The patient had received her first COVID-19 vaccine (BNT162b2; Pfizer-BioNTech) 11 days before presentation, and had first noticed the papules 2 days later (9 days before presentation). She had not applied anything to her arm. She had no history of allergic reactions to other vaccines or to disinfectants, and no history of HIV infection.

Three weeks after her first vaccination, the patient received her second vaccination, and similar eruptions appeared 2 days later (Fig. 1b).

We attributed the eruption to the second vaccination. A skin biopsy was taken from the site, and histopathological examination showed features of folliculitis and perifolliculitis with a mixed cell infiltrate of eosinophils and some neutrophils. In particular, the upper portion of the hair follicle was damaged and replaced by ballooned follicular epithelia with a sprinkling of eosinophils. There was no remarkable epidermal change as would be seen in contact dermatitis (Fig. 2a–d). Immunohistopathological examination revealed that most of the infiltrated mononuclear cells were positive for CD3 and CD4.

We diagnosed these papules as eosinophilic pustular folliculitis (EPF), most likely caused by the COVID-19 vaccine, because similar eruptions developed at the injection site both times. The area of eruption extended beyond the injection site, possibly due to vaccine spread around the injection site in the course of being absorbed into the body.

We treated the patient with topical steroid, and the rash improved within 10 days.

According to recent reports, the common cutaneous reactions to the mRNA-based COVID-19 vaccines (Moderna and Pfizer) are pruritic erythema, swelling, pain, urticaria, morbilliform rash and erythromelalgia.¹ According to previous reports, some drugs and subcutaneous

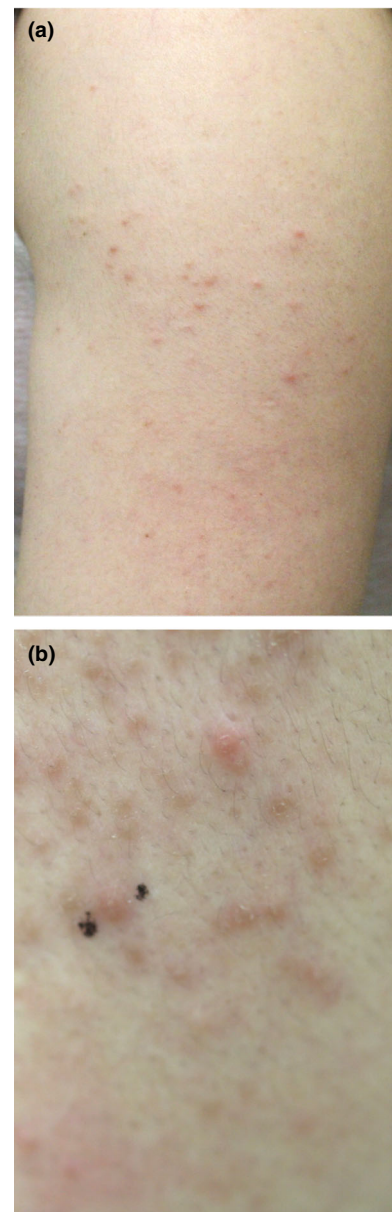


Figure 1 (a) Clinical presentation at first visit (11 days after the first vaccination), manifesting as papules on the left upper arm. (b) Clinical presentation at second visit (2 days after the second vaccination); the papules on the left upper arm were more numerous than at the first visit.

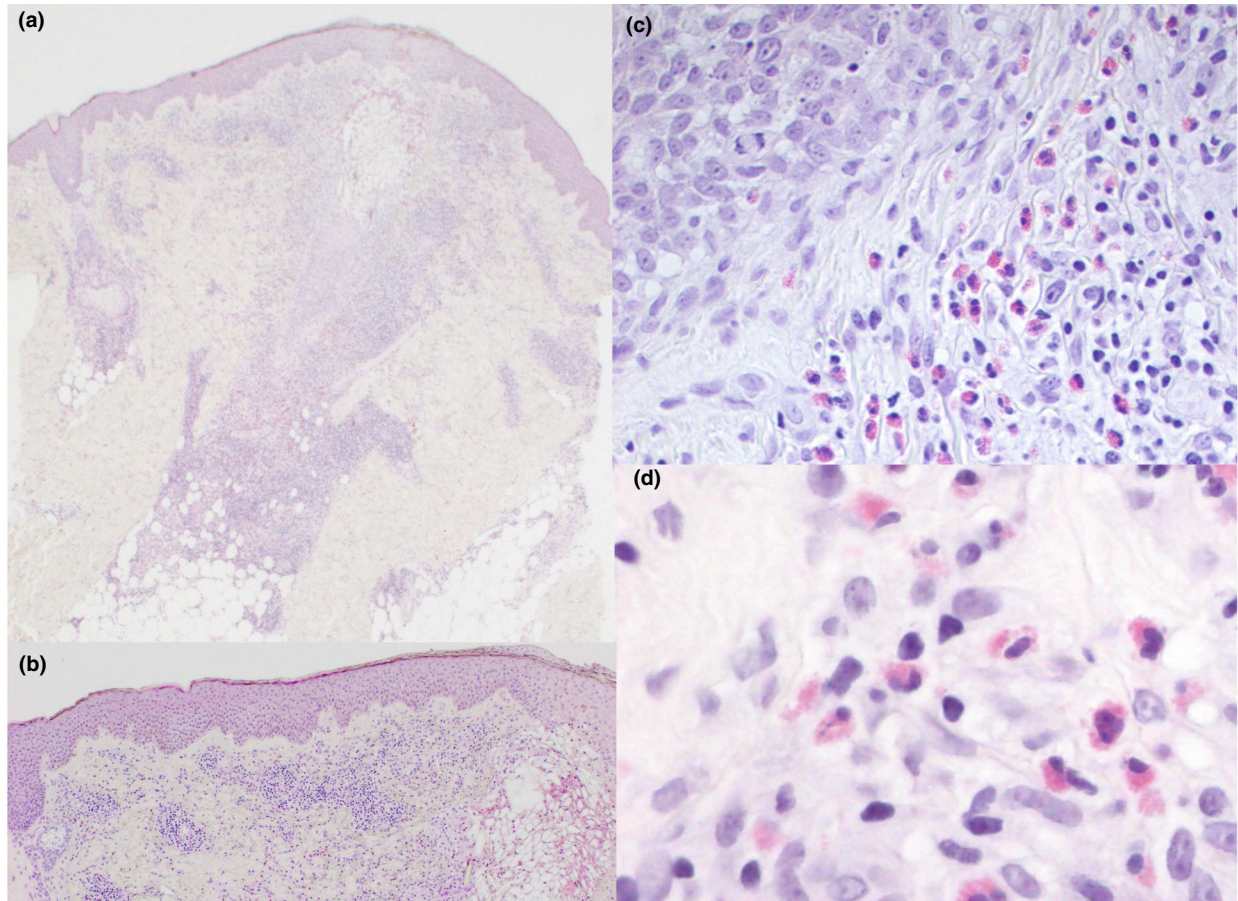


Figure 2 (a–d) Histological changes of the papule, revealing superficial and deep, perivascular and interstitial, and some periadnexal mixed cell infiltrates with eosinophils, neutrophils and lymphocytes. The upper portion of the follicle was destroyed and showed ballooning change of follicular epithelium. There was no remarkable epidermal change as would be seen in contact dermatitis. Features of perifolliculitis were also observed. Haematoxylin and eosin, original magnification (a) $\times 10$; (b) $\times 40$; (c) $\times 200$; (d) $\times 400$.

silicone injections can induce EPF,² therefore it seems likely that vaccination can also cause EPF. We therefore considered that this case was drug-induced EPF, similar to the classic EPF (Ofuji disease). Another report suggested that skin-tropic viral reactivation of human polyomaviruses 6 might be related to the development of EPF,³ and there is a possibility that similar reaction occurred in our case. Some authors have reported that histological features of delayed large local reaction include slight perivascular infiltration of lymphocytes and eosinophils,⁴ while other authors have reported perivascular and perifollicular infiltration of lymphocytes and scattered eosinophils and mast cells.⁵ Although these histological characteristics are similar to those of our case, the perifollicular infiltration of lymphocytes was more severe in our case than in previously reported cases. We speculate that this is because follicular papules were observed in our case, although it is unknown why so

many CD4-positive T cells infiltrated around follicles and why EPF developed in our case. We believe that the follicles were destroyed because severe infiltration of inflammatory cells caused ballooned follicular epithelia as a secondary change. Some genetic or racial factors might influence the development of EPF in our case. Further evaluation for the cutaneous reactions to mRNA-based vaccines is needed.

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Data availability: Data are available on request from the corresponding author.

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