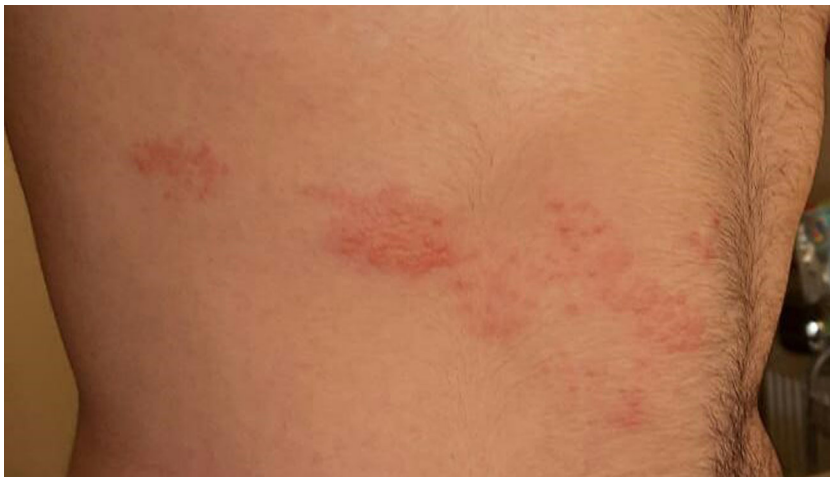

Figure 1 Painful vesicles on an erythematous base in a dermatomal configuration on abdomen.

vaccination, young age and previous reports[3,4] are arguments that support our cases' link between HZ and vaccination. COVID-19 vaccine-associated HZ was not reported in published vaccine studies,[9,10] and case reports may help to define this possible side effect.

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Conflict of interest

Dr. Ahmet Kağan Özdemir does not report any conflict of interest. Dr. Sera Kayhan does not report any conflict of interest. Dr. Seray Külcü Çakmak does not report any conflict of interest.

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Rare cutaneous adverse effects of COVID-19 vaccines: a case series and review of the literature

Dear Editor,

Among the vaccines against coronavirus disease 2019 (COVID-19), BNT162b2 from BioNtech-Pfizer and mRNA-1273 from Moderna are mRNA vaccines targeting the spike protein of the severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). The ChAdOx1 nCoV-19 (AZD1222) from Oxford-AstraZeneca is based on adenovirus expressing the full-length spike protein. Clinical trials reported different cutaneous adverse events, mainly local injection site reactions, either immediate or delayed on/after 8 days.[1–3]

Table 1 Clinical and pathological characteristics of cutaneous adverse events induced by COVID-19 vaccines

Patient	1	2	3	4	5	6	7	8
Sex, Age (y)	F,72	M, 55	M,76	F, 67	F, 55	F, 80	F, 43	M, 44
Comorbidities	Hypothyroidism, depression	None	None	Idiopathic CD4 immunodeficiency, thyroiditis, cutaneous vasculitis	Familial myoclonic dystonia	Mycosis fungoides, hypothyroidism, depression	HIV, Kaposi's disease	None
Prior COVID-19 infection	No	No	No	No	No	No	No	No
Vaccine	Pfizer	Pfizer	Pfizer	Pfizer	Pfizer	Moderna	Astra Zeneca	Astra Zeneca
Time from 1st (or 2nd where indicated) dose to skin reaction onset (d)	7	4 / 5 (after 2nd injection)	5	8	12	2 (after 2nd injection)	3	3
Cutaneous manifestations	Morbilliform rash (50% of BSA)	Erythematous indurated nodules/ chilblains	Diffuse erythematous rash (80% of BSA)	Morbilliform rash, pathergy reaction (50% of BSA)	Livedo racemosa of thighs	Fixed drug eruption	Diffuse maculopapular pustular exanthema (>80% of BSA)	Oedematous infiltrated plaque of buttock and thigh
Histopathological features	Spongiotic dermatitis	NA / papillary dermal oedema, superficial and deep perivascular and perieccrine lymphocytic infiltrate	Vacuolar interface dermatitis, spongiosis, perivascular superficial lymphocytic infiltrate	NA	Epidermal dysmaturation, vacuolization of basal keratinocytes, apoptotic cells	Vacuolar interface dermatitis, perivascular superficial lymphocytic infiltrate with numerous eosinophils	Lichenoid interface dermatitis, intracorneal pustules, lymphocytic infiltrate with numerous eosinophils	Papillary dermal oedema, superficial and deep perivascular lymphoplasmocytic infiltrate
Systemic manifestation	None	None for both manifestations	None	None	None	None	Eosinophilia, leucocytosis	Fever
Specific treatment	None	None for bothmanifestations	Topical CS, phototherapy	Topical CS	None	Topical CS	topical CS	none
Evolution	Resolution within 8d	Resolution within 7d for both manifestations	Improvement	Resolution within 15d	Persistence of post-inflammatory pigmented lesions at 2 months	Resolution within 5d	Resolution within 30d	Resolution within 16d
Relapse following the 2nd dose	No	Yes (but different manifestation)	Yes	No	No	Appeared after the second dose	No (received Pfizer vaccine)	No

F, female; M, male; y, year; d, day; BSA, body surface area; NA, non-available; CS, corticosteroids.

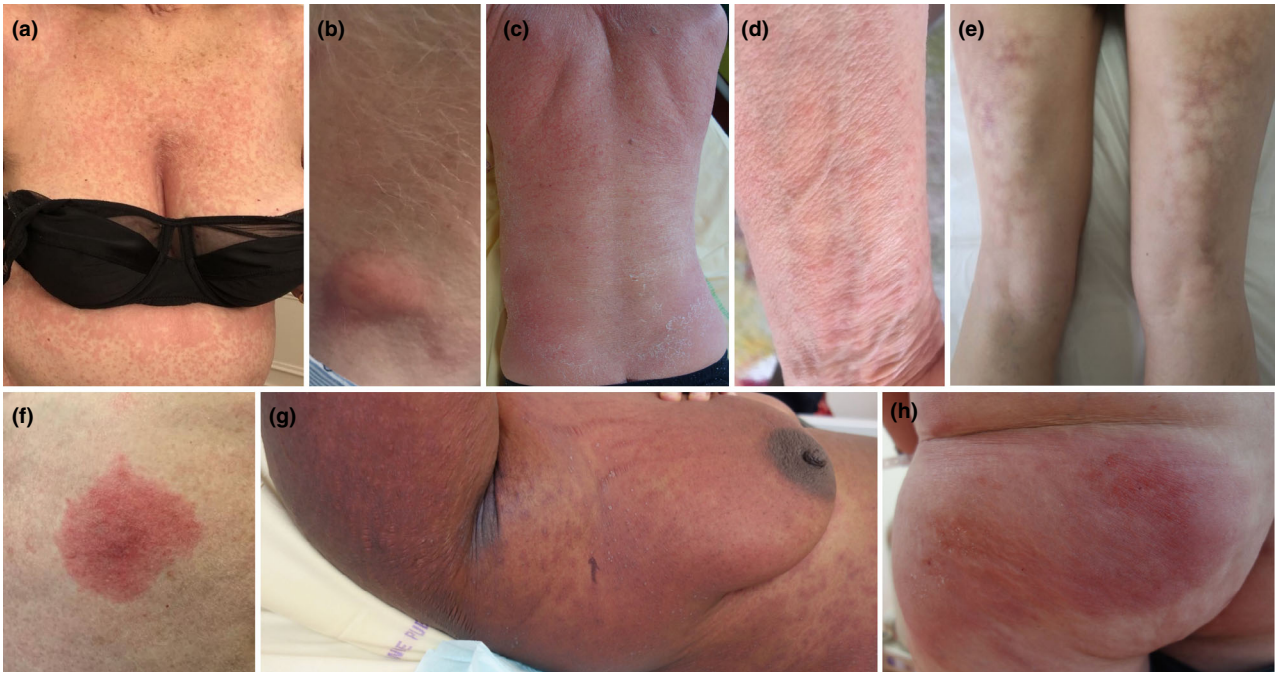

Figure 1 Cutaneous manifestations induced by COVID-19 vaccines. Clinical pictures of morbilliform rashes (a, Patient 1; d, Patient 4), cervical erythematous indurated nodule (b, Patient 2), a diffuse erythematous rash (c, Patient 3), livedo racemosa (e, Patient 5), FDE (f, Patient 6), AGEP (g, Patient 7) and oedematous infiltrated plaque (h, Patient 8).

We conducted a retrospective observational study among patients referred to the Dermatology Department of Cochin Hospital from January 2021 to April 2021 who presented with skin manifestations induced by COVID-19 vaccines. We excluded patients with immediate and/or delayed local site injection reactions.

We included 8 consecutive cases, 3 men and 5 women, aged from 44 to 80 years, with no history of prior SARS-CoV-2 infection (6 patients had negative SARS-CoV-2 serology) or prior vaccine/drug-induced manifestations (Table 1). Five, 1 and 2 patients received Pfizer, Moderna or Oxford-AstraZeneca vaccine, respectively. We observed various skin reactions on average 6 days after the first dose: 2 morbilliform exanthemas, diffuse cutaneous erythema, acute generalized exanthematous pustulosis (AGEP), localized oedematous infiltrated plaque, erythematous indurated nodules or livedo racemosa (Fig. 1, Table 1). Patient 6 developed fixed drug eruption (FDE) 2 days after the second dose without previous history of FDE. No associated systemic manifestation was observed except in Patients 7 and 8 who presented with eosinophilia and fever, respectively. Patient 5 showed a livedo racemosa mimicking erythema ab igne without history of chronic heat exposure. A skin biopsy was performed in 7 patients (Table 1). Pathological examination showed several different non-specific patterns including association of features of spongiotic and interface dermatitis. Several cases resembled cutaneous drug reactions and 2 had inflammatory infiltrate with numerous eosinophils. In one case, skin biopsy displayed a superficial and deep perivascular and perieccrine lymphocytic infiltrate similar to those of chilblains or chilblain-like lesions. Symptoms subsided within 8–30 days in 6 patients; mild symptoms persisted in 2 cases. Relapse or new skin manifestations occurred in 2 patients following the second dose without worsening of symptoms. Patient 3 relapsed 4 days after the second dose with diffuse cutaneous erythema, also treated with topical corticosteroids and UVB phototherapy. Patient 2 presented with 2 erythematous nodules 4 days after the first dose and chilblains 5 days after the second dose without nodules relapse. A serology performed 2 days after chilblains onset revealed high levels of spike-specific IgG antibodies. Patient 7 presenting with AGEP did not relapse upon second dose of Pfizer vaccine (Table 1).

Various skin reactions (local site and delayed large local reaction, urticaria, morbilliform purpuric and/or oedematous rash, erythromelalgia, pernio/chilblains, vasculitis) were recently described following Pfizer or Moderna COVID-19 vaccine.[3–5] We report for the first time vaccine-induced livedo, FDE, AGEP or distant localized oedematous infiltrated plaques or nodules. Relapse occurred in 2 of our patients following the second dose without worsening of symptoms. One relapsing morbilliform rash and 2 cases of recurrent chilblains were described in patients following Moderna and Pfizer vaccine.[6–8] In McMahon study, 43% of patients with first-dose reactions experienced second-dose recurrence with similar, milder or more severe

reactions in 28%, 28% and 45% of cases, respectively.[4] Practitioners should be aware of these side-effects of COVID-19 vaccines which do not require vaccination discontinuation.

Similar COVID-19-associated manifestations have been described in a registry of 716 cases: morbilliform rash (22%), pernio-like lesions (18%), urticaria (16%), retiform purpura (6.4%), and macular erythematous (13%), or vesicular (11%), or papulo-squamous lesions (9.9%).[9,10] One could hypothesize a common immune response directed against the spike RNA or protein inducing vaccine and virus-associated skin lesions.

Compliance with ethical standards

The patients in this manuscript have given written informed consent to publication of their case details in accordance with French Bioethics Law for retrospective non-interventional research studies.

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Author contributions

N.D., S.G. and B.O. designed the study. E.A. N.D., B.G., N.F., S.A., S.G. and B.O. consulted with the different patients. E.A., S.G. and B.O collected the data. P.S. performed the pathological analysis. E.A., N.D., S.G. and B.O. wrote the manuscript with the input from all the other authors.

Conflict of interest

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E. Annabi and N. Dupin contributed equally to this report as first authors. S. Guégan and B. Oulès contributed equally to this report as co-senior authors.

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Late-onset pustular skin eruption in a healthy neonate born from COVID-positive mother: a coincidence or a new skin sign of the infection?

Dear Editor,

We recently came across a male newborn with a diffuse pustular eruption of the trunk and the face appeared on 25th day of life. The baby was born from asymptomatic COVID-19-positive mother and was otherwise healthy. Patient's throat swab PCR diagnostic test for SARS-CoV-2 was negative. A detailed clinical examination revealed monomorphic small pustules predominantly affecting the upper part of the chest and to a minor extent the face (Fig. 1a–b). The lesions quickly self-improved within 1 week leaving a network-like hyperpigmentation and fine desquamation (Fig. 2). Unfortunately, because of fast and spontaneous improvement of the lesions, bacterial and fungal cultures were not obtained from skin lesions. On the basis of the

