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LETTER

The first case report of Pityriasis lichenoides chronica following COVID-19 mRNA vaccination

Dear Editor,

Many cutaneous adverse reactions to the Coronavirus disease-2019 (COVID-19) vaccines have been reported. Delayed reactions, which occur following several days or weeks, either involve new onset cutaneous disorder or flare of preexisting dermatomes. Here, we report the first case of new onset Pityriasis lichenoides chronica (PLC) following the Pfizer-BioNTech COVID-19 mRNA vaccine, aiming to highlight their possible association.

An adolescent 16-year-old boy experienced gradual onset of asymptomatic scaly erythematous papules over his trunk (Figure 1A, B). The eruption started 1 week after the first dose of the Pfizer-BioNTech COVID-19 vaccine. However, the patient did not seek medical advice or receive any treatment. Following the second dose, the eruption increased progressively all over the trunk and extremities, with the appearance of numerous purpuric lesions. Mucous membranes and nails were free. A skin biopsy was taken after signing a written consent. It revealed parakeratosis, moderate spongiosis and focal vacuolar alteration of the basal cell layer. The papillary dermis showed mild edema, and extravasated red cells, with superficial and deep dermal perivascular, predominantly lymphocytic infiltrate, and was diagnosed as PLC (Figure 1C,D). Laboratory investigations including complete blood count, liver function, renal panel, C-reactive protein and erythrocyte sedimentation rate, were normal. Serology for HCV, HBV, HIV and ANCA antibodies were negative. SARS-Cov-2-IgG was positive (index > 40,000 AU/ml)).

Although the patient was prescribed doxycycline 100 mg cap twice per day with narrow band ultraviolet B (nb-UVB) phototherapy twice per week and topical clobetasone dipropionate cream and Tacrolimus 0.1% ointment, new crops of lesions continued to appear over 6 weeks of follow-up. The prescribed antibiotic was then changed to azithromycin 500 mg on day one followed by 250 mg once daily for 3 days, and the course was repeated every other week for 8 weeks with continued nb-UVB sessions. Lesions started to subside with no new lesions over the next 2 months.

One month following skin clearance, the patient acquired COVID-19 infection confirmed by nasopharyngeal swab COVID-19 PCR. However, he did not develop flare up of his subsided lesions.

Immunogenic response to vaccines alters cytokines levels activating different key players of the innate and adaptive immune system. The skin and mucosa are greatly influenced by the non-specific activation of the immune system sparked by vaccines.[1]

Pityriasis lichenoides (PL) are spectrum of rare cutaneous inflammatory diseases which affect mainly children and young adults. It is known to be triggered by extrinsic antigens such as infectious agents, drugs and vaccines.[2] Only 10 reports of vaccine-induced cases were previously documented following different types of vaccines such as measles, rubella, mumps, influenza, adult tetanus, diphtheria, and human papilloma virus vaccines.[3]

Up to date, pityriasis lichenoides et varioliformis acuta (PLEVA) and PLEVA-like eruption has been reported three times following BioNTech/Pfizer COVID-19 vaccination (Table 1).[4–6] It was also reported in 10 pediatric patients following COVID-19 infection.[7] Moreover, a 42-year-old female was documented to develop PLC suddenly following COVID-19 infection.[8] Thus, our presented adolescent boy is the first PLC case to be reported (also in pediatrics) following COVID-19 mRNA vaccine.

In vaccine triggered cases, three pathogenic hypotheses are suggested. It is either an inflammatory skin reaction secondary to the vaccine as a trigger or vaccine-induced activation of immune-complex mediated hypersensitivity reaction and/or T-cell clonal proliferation.[2] These events could be sequalae to the up-regulated inflammatory/immunological reactions or cross reactivity between viral particles or adjuvant molecules and self-antigens.[4] However, in our patient, the absence of recurrent lesions following COVID-19 infection signifies that the reaction was vaccine related and not virus correlated.

In the American Academy of Dermatology and the International League of Dermatologic Societies' COVID-19 Dermatology Registry, COVID-19 mRNA vaccines (Moderna or Pfizer-BioNTech) have been linked to 40 cases of herpes virus (HSV/VZV) reactivation. Although the definite mechanism is not clear, herpesvirus reactivation may be the consequence of innate- or cell-mediated immune defense failures initiated by the host response to vaccination.[9] HSV reactivation have been blamed as being one of the infectious triggers for PL and its clinical improvement might be achieved by using systemic antiviral therapy.[10] This refers to the possible endogenous herpes virus reactivation by the vaccine that eventually triggers the onset of PLC. However, this suspicion warrants further research and investigations.

Using Naranjo adverse drug reaction probability scale, the reaction was considered possible (score 4).[11] Thus, it has to be stressed that the reported case alarms the possible link between COVID-19 vaccines and PL, although it does not confirm causality. These rare adverse events are only possible to identify through spontaneous reporting. Large-scale pharmacovigilance studies should be conducted to confirm or disprove the suspected causal relationship. Then, further research is needed to clarify the exact pathogenesis of such newly developed mRNA vaccines.

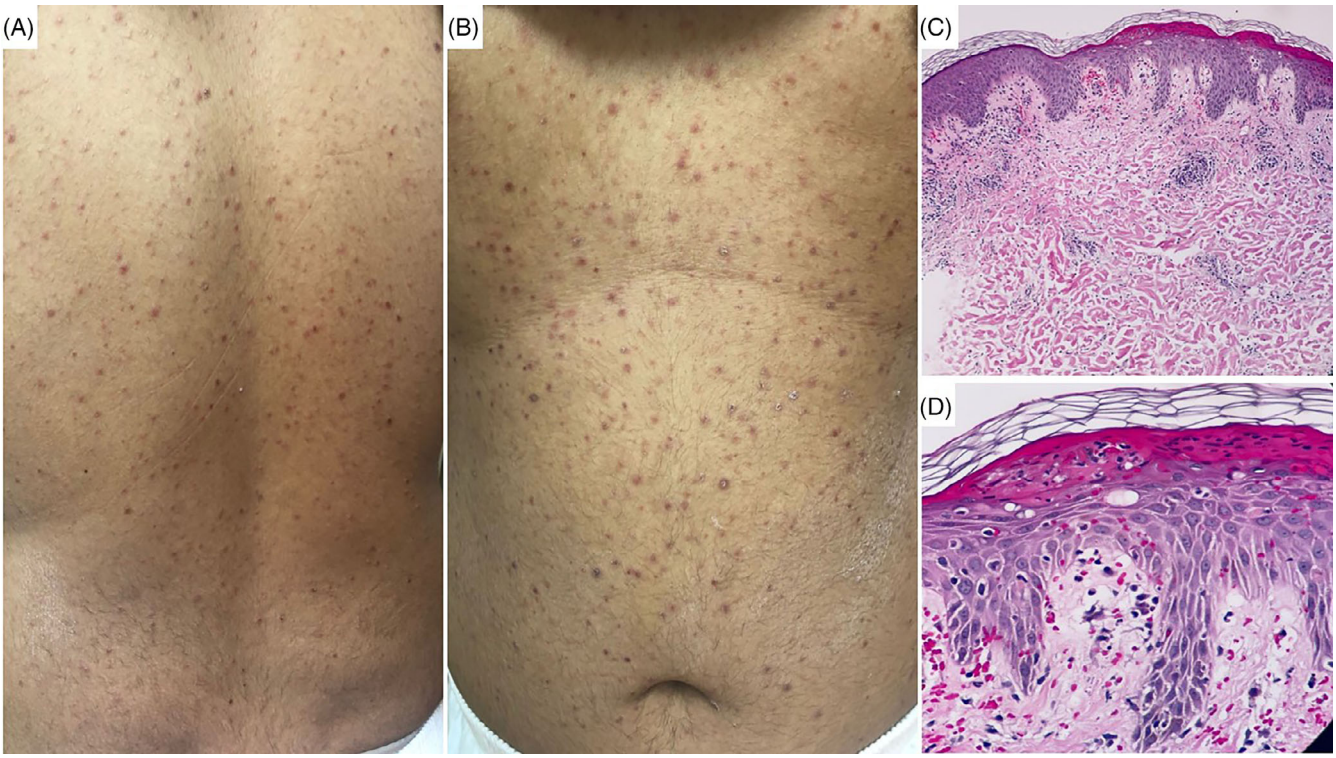

FIGURE 1 A case of PLC showing (A, B) discrete erythematous papules with overlying mica scales scattered over the trunk. H&E sections showed (C) parakeratotic scale crust and superficial and deep dermal perivascular, inflammatory infiltrate (H&E ×10) (D) Higher power view of previous section showing parakeratotic scale crust with neutrophils, moderate epidermal spongiosis, papillary dermal edema, extravasated RBCs, and perivascular, predominantly lymphocytic infiltrate (H&E ×40)

TABLE 1 Summary of COVID-19 vaccine induced Pityriasis lichenoides

Reference	Age/sex	Clinical presentation	Vaccine	Latency after 1st dose	Treatment/outcome
Sechi et al.,[4]	70/M	PLEVA	BioNTech/Pfizer 2nd dose	5 days	Complete remission within 10 weeks of topical combination of fusidic acid 2% plus betamethasone cream 0.1%
Sernicola et al.,[5]	31/F	PLEVA-like	BioNTech/Pfizer 1st dose	10 days	Remission within 2 months with oral methylprednisolone tapered over 3 weeks
Palmén et al.,[6]	81/M	PLEVA	BioNTech/Pfizer 1st dose	9 days	Remission after 5 months of oral prednisolone and topical high potency steroid
Current case	16/M	PLC	BioNTech/Pfizer 1st and 2nd dose	7 days	Remission following 14 weeks treatment with oral antibiotics courses (doxycyclin/azithromycin), topical Tacrolimus 0.1 and nb-UVB sessions

Abbreviations: PLC, Pityriasis lichenoides chronica; PLEVA, pityriasis lichenoides et varioliformis acuta.

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CONFLICT OF INTEREST

Authors declare no conflicts of interest.

AUTHOR CONTRIBUTIONS

Noha Mohammed Dawoud: Conception and design, acquisition and analysis of data, literature review, manuscript writing. **Huma Aslam:** Data acquisition, investigations, manuscript review. **Ishraga Mahmoud Ali:** Data acquisition and analysis, manuscript review. **Marwa Mohammed Dawoud:** Data acquisition, investigations, interpretation of data, manuscript review.

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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