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CASE REPORT

Sneddon-Wilkinson Disease Induced by COVID-19 Vaccine: An Unusual Presentation

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Abstract: Sneddon–Wilkinson disease (SWD) is a rare neutrophilic dermatosis characterized by distinctive hypopyon pustules that predominantly affect flexural and intertriginous regions. The triggers for the disease are multifarious. Here, we report a case of SWD induced by a COVID-19 vaccine with erythema and crust, which was successfully treated with compound glycyrrhizin, leading to complete remission. And we propose that the mechanism behind vaccine-induced SWD may be associated with the ACE2 expression on keratinocytes.

Keywords: Sneddon–Wilkinson disease, subcorneal pustular dermatosis, vaccine, COVID-19

Introduction

Sneddon–Wilkinson disease (SWD), a rare neutrophilic dermatosis, was first described by SNEDDON and WILKINSON in 1956, now considered as a "classical" subtype of subcorneal pustular dermatosis (SPD).[1] It is characterized by crops of superficial hypopyon vesiculopustules on the trunk, intertriginous and flexural areas of the extremities.[2] Skin biopsy shows sterile collections of neutrophils in the uppermost layers of the epidermis.[3] The diagnosis is based on the clinical symptoms and histologic findings after excluding other diseases like IgA pemphigus, pustular psoriasis, acute generalized exanthematous pustulosis, etc. Drug exposure history, family history of psoriasis, direct immunofluorescence and histologic feature would contribute to distinguish SWD from other diseases.

The etiology of SWD is unknown, and some researchers view it as a reaction pattern in the skin that may result from systemic diseases, including underlying paraproteinemia, myeloma, or rarely, lymphomas or solid tumors. A few cases of SWD have been associated with systemic infections such as Mycoplasma pneumoniae, despite the absence of direct skin involvement.[4] Cutaneous reactions after SARS-CoV-2 vaccination have been reported heterogeneously, including urticaria, vitiligo and erythema nodosum,[5–7] here we describe a case of a young woman with SWD secondary to COVID-19 vaccine presenting atypical manifestations that was successfully treated by compound glycyrrhizin with no recurrences.

Case Report

A 29-year-old woman presented to our dermatology department with recurrent erythema and desquamation that she had experienced for four months. She had no significant medical history, apart from the fact that she had received a third dose of inactivated SARS-CoV-2 vaccine 8 days before the eruption.

The rash initially manifested as a dry and flaking skin which did not respond to the application of a moisturizing cream. Two months later, erythematous plaques developed in the groin, antecubital fossae, and periumbilical region (Figure 1a), turning into crusts (Figure 1b). The patient experienced similar but self-resolving symptoms after prior vaccine doses, leading to initial underestimation of the severity of her condition.

When we examined the patient on the first visit to our department, we observed that the underarms, chelidons, and groins were involved, presenting with circinate superficial scaling, central hyperpigmentation, and peripheral erythema.

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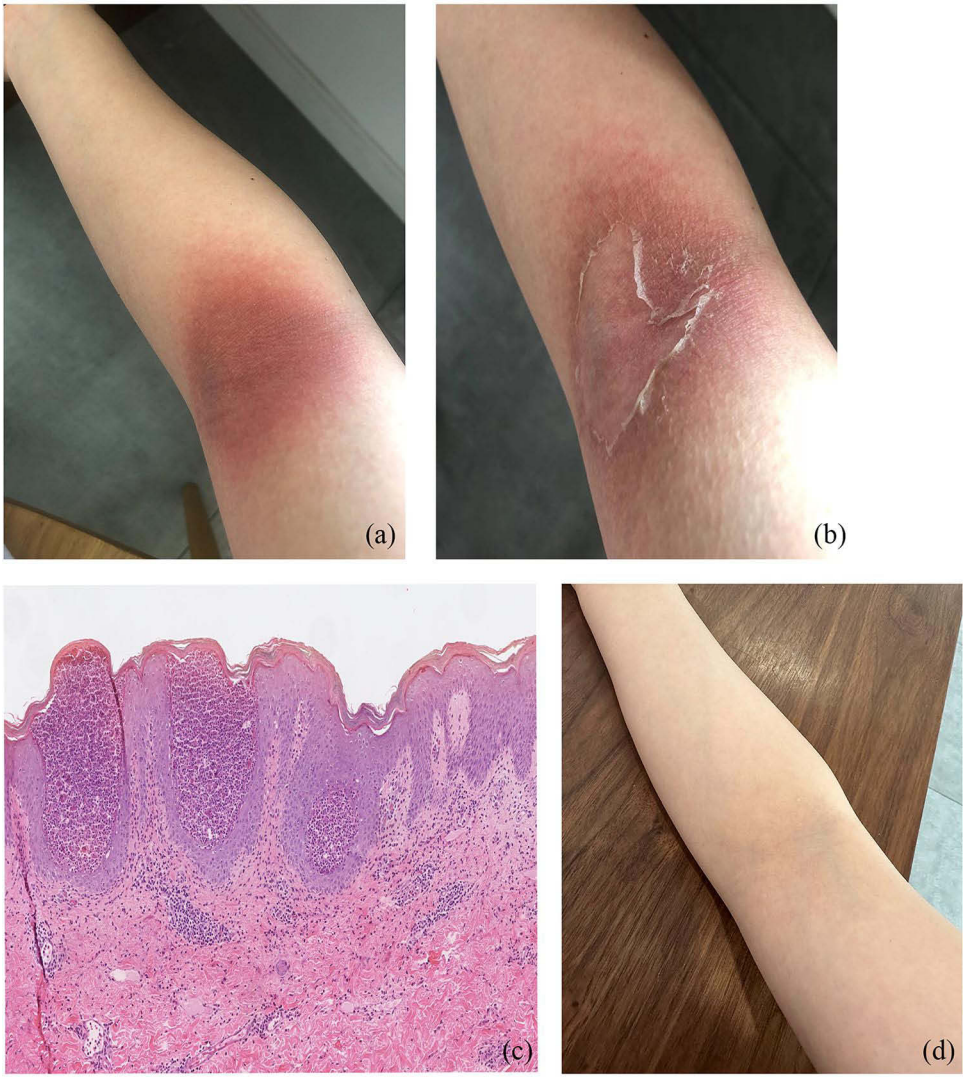

Figure 1 (**a**) Erythema on the chelidon at first. (**b**) erythematous plaques with annular crust. (**c**) Subcorneal pustules filled with neutrophils and neutrophils migrate from blood vessels to the underside of the stratum corneum (hematoxylin and eosin, ×10). (**d**) Follow-up visit without recurrence.

Laboratory tests, such as an antinuclear antibody panel, blood count values and rheumatoid factors, were normal. Bacterial cultures and serologic tests for pemphigus (anti-desmoglein antibodies) and pemphigoid (BP180 and BP230 antibodies) were negative. A skin biopsy showed the stratum corneum layer split from the rest of the epidermis because of the accumulation of neutrophil above the stratum spinosum, and it could be clearly observed neutrophils migrated from dermal capillaries and clumped together in spinous layer to the subcorneal layer (Figure 1c). No parakeratosis, acanthosis or psoriasiform hyperplasia as well as apparent spongiosis were observed. Directed immunofluorescence staining including IgG, IgM, IgA and C3 were not observed. We confirmed the diagnosis of Sneddon–Wilkinson disease and prescribed a compound glycyrrhizin for 2 months. Erythema had subsided, leaving a slight hyperpigmentation with no adverse effects (Figure 1d). There was no recurrence after 2 years of follow-up, and no flaccid pustules were observed during this period.

Discussion

Sneddon–Wilkinson disease is an inflammatory condition characterized by the infiltration of subcorneal neutrophils.[8] The etiology of SWD is not completely clear; some cases are associated with systemic or extracutaneous conditions such as inflammatory disease and hematologic disorders.[9] In rare cases, induced by SARS-CoV-2 infection[10] and COVID-19

vaccines,[11] the affected population associated with COVID-19 in above cases are relatively young with mild symptoms, and the condition could generally be cured with conventional therapy without recurrence. As is known to all, inactivated COVID-19 vaccines contain viruses whose genetic material has been destroyed but can still trigger an immune response,[12] we suspect there are certain antigens both COVID-19 virus and vaccine have that could trigger certain SWDs.

Experiments in animals have shown that SARS-CoV-2 virus relies on obligate receptor, angiotensin-converting enzyme 2 (ACE2), to enter cells, inducing infection.[13] And a high expression of ACE2 has been observed in keratinocytes,[14] which indicates that keratinocytes are more likely to be infected by the virus than other cells with less ACE2. Upon infection, infected cells would release inflammatory cytokines to recruit large numbers of granulocytes,[15] which may reveal the neutrophil aggregation and pustule formation in SWDs. Since the vaccine of COVID-19 has the similar structure with the COVID-19 virus, the mechanism of vaccine-induced SWD may be the same. In addition, other neutrophilic cutaneous reactions induced by COVID-19 vaccine including Sweet syndrome,[16] facial pustular neutrophilic eruption,[17] as well as generalized pustular psoriasis[18] already have been reported.

Conclusion

In the present case, the patient had a red rash after the first injection of the SARS-CoV-2 vaccine, but she did not raise concerns, and with increased exposure, the symptoms were more severe, although causality cannot be definitively established, the temporal association with vaccination and absence of other potential triggers strongly suggest a vaccine-related etiology. The case underlines that COVID-19 vaccination may act as a trigger for atypical SWD with a good prognosis following standard treatment, and explains the probable link between SWD and SARS-CoV-2 vaccine.

Patient Consent Statement

Written informed consent was obtained from the patient for the publication of this case report and any accompanying images.

Institutional Review Board Approval

This study received approval from the Institutional Research Ethics Committee of the Hangzhou Third People's Hospital and the approval consent number was 2025KA001.

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Disclosure

The authors declare they have no conflicts of interest in this work.

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