However, this limitation was reduced by using validated algorithms.[5,6] Secondly, reverse causation and possible confounders may limit the establishment of firm causal inferences even in well-designed observational studies. The strengths of our study are the large sample, the use of validated algorithms, and the proper matching of cases and controls.

In conclusion, our study utilized a population-wide database and indicates that patients with SSDs do not appear to have a higher risk of developing psoriasis and PsA. Further well-designed studies are warranted.

Data Availability

The data that support the findings of this study are from the Ontario Health Administrative held at ICES. Restrictions apply to the availability of these data, which were used under license for this study.

A.F. Carvalho,[1,2] M.O. Machado,[3,4] E. Mallia,[2,5] X. Liu,[6] L. Eder,[7] M. Solmi,[8] V. Piguet[3,4] and P. Kurdyak[1,2,5]

[1]*Department of Psychiatry, University of Toronto, Toronto, ON, Canada;* [2]*Centre for Addiction and Mental Health, Toronto, ON, Canada;* [3]*Division of Dermatology, Women's College Hospital, Toronto, ON, Canada;* [4]*Division of Dermatology, Department of Medicine, University of Toronto, Toronto, ON, Canada;* [5]*Institute for Clinical Evaluative Sciences, Toronto, ON, Canada;* [6]*Faculty of Medicine, University of Toronto, Toronto, ON, Canada;* [7]*Women's College Research Institute, Department of Medicine, University of Toronto, Toronto, ON, Canada; and* [8]*Department of Neurosciences, University of Padova, Padova, Italy*

Email: *andrefc7@hotmail.com*

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Pernio after COVID-19 vaccination

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Dear Editor, Pernio-like acral lesions are a common dermatological manifestation reported after SARS-CoV-2 (COVID-19) infection.[1,2] The pernio-like eruption characteristically seen on the feet has been coined 'COVID toes'. These lesions are more often seen in mild to asymptomatic patients and represent a late manifestation of COVID-19 infection.[1] Here, we present a case of a patient with pernio that appeared after the Pfizer BNT162b1 COVID-19 vaccine, in an asymptomatic individual with negative polymerase chain reaction (PCR) testing.

A 64-year-old male presented to the emergency department in January 2021 with violaceous skin discoloration for 10 days that started on the left hallux and gradually spread to all toes on the bilateral feet. The patient received the second dose of the Pfizer COVID-19 vaccine 3 days prior to onset of the left toe discoloration. He denied hot or cold exposure, numbness, tingling or pain. He denied history of pernio or other similar lesions, Raynaud's phenomenon, oral ulcers, photosensitivity, vascular disease, cardiac disease, hypercoagulable state, cardiac procedure or autoimmune diseases. He denied previous or current symptoms of COVID-19 or

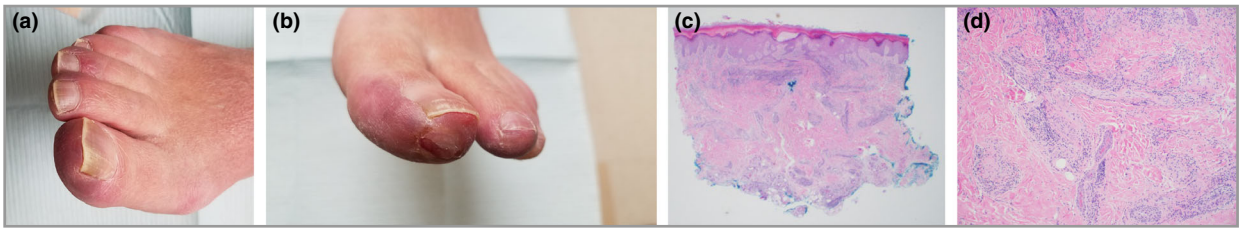

Figure 1 (a) and (b) Acral rash at follow-up visit on right foot and left foot, respectively; 28 days post vaccine. (c) and (d) There is a superficial and deep infiltrate of lymphocytes around vessels and eccrine glands, with papillary dermal oedema. No thrombi or vasculitis are seen. Haematoxylin and eosin stain, original magnification × 20 (c) and × 100 (d)

exposure to those with COVID symptoms or a positive test. The estimated local prevalence of the virus was 7·6%. The patient had three negative COVID-19 PCR tests in the 2 months prior to presentation, and negative testing at presentation. The patient denied any adverse reactions after the first dose of the vaccine.

The patient had painless, dark erythematous to violaceous discoloration of the bilateral toes, with an intact bulla on the left hallux. Abnormalities on initial laboratory studies included elevated C-reactive protein.

The differential diagnosis included idiopathic pernio, connective tissue disease, hypercoagulable state, vasculitis/vasculopathy, COVID-19 infection or reaction to the vaccine. Laboratory workup including Hepatitis B, Hepatitis C, HIV, antinuclear antibody, antineutrophil cytoplasmic antibody, antiphospholipid antibodies, complements C3/C4/CH50, rheumatoid factor, and serum and urine protein electrophoresis was initiated to rule out other aetiologies in the differential diagnosis. The key differentiating feature between COVID-19-associated pernio and idiopathic pernio is the lack of association with cold exposure.[3] Idiopathic pernio was unlikely as the local weather was relatively mild; daily temperatures averaged 9–20 °C in the weeks before and after the lesions appeared.

The patient was in a stable condition and was discharged with clobetasol 0·05% ointment for the affected toes with a plan to follow-up in the outpatient dermatology clinic in 2 weeks. At follow-up 15 days after initial presentation (28 days after vaccination), the clinical appearance of the toe discoloration was unchanged (Figure 1). The patient's symptoms were now exacerbated by cold temperatures and improved with rewarming and leg elevation.

Laboratory workup was unrevealing. A punch biopsy of the left great toe was obtained, which revealed pathology consistent with pernio and immunohistochemistry (IHC) staining for SARS-CoV-2 of the tissue was negative (Figure 1). COVID infection remained a possibility. However, negative testing and lack of symptoms or contact with infected individuals argued against this. Thus, the final diagnosis was pernio, temporally associated with the second dose of Pfizer mRNA SARS-CoV-2 vaccine. The patient was counselled to use clobetasol as needed and avoiding cold exposure.

This presentation suggests possible attribution of the pernio-like lesions to an immune response triggered by the COVID-19 mRNA vaccine, potentially similar to the immune response after Sars-CoV-2 itself, which also triggers pernio. Notably, a similar but prolonged course of toe discoloration after the first dose of the Pfizer mRNA vaccine has been reported.[4] The American Academy of Dermatology/International League of Dermatological Societies COVID-19 registry has noted eight of these pernio-like reactions after vaccination, but at present no cases of patients with biopsy confirmation have been reported.[5]

Our understanding of the pathophysiology connecting COVID-19 and pernio is continuing to grow. A recent study demonstrated these lesions as part of the spectrum of COVID-19 by demonstrating IHC evidence of SARS-CoV-2 in endothelial cells of skin biopsies of patients with clinically diagnosed COVID-19-related pernio.[6] Moreover, patients with pernio-like lesions observed during the pandemic demonstrated a significantly higher interferon-alpha response than those with moderate or severe COVID-19, characteristic of a viral-induced type I interferonopathy.[7] The mRNA COVID-19 vaccine BNT162b1 elicits a $CD4^+$ type I T helper cell response and strong interferon-gamma and interleukin-2 producing $CD8^+$ cytotoxic T-cell responses.[8] This could suggest that the vaccine is eliciting a similar response in the skin as the pernio-like lesions attributed to COVID-19.

This presentation raises considerations regarding the potential pathophysiology of COVID-19 and pernio as well as potential sequelae of the vaccine. Additional studies of host immune response in the skin after Sars-CoV-2 infection and COVID-19 vaccines are necessary for further understanding.

S. Lopez [1], P. Vakharia [1], T. Vandergriff [1], E.E. Freeman [2] and R. Vasquez[1]

[1]*University of Texas Southwestern Medical Center, Dallas, TX, USA and* [2]*Massachusetts General Hospital, Harvard Medical School, Boston, MA, USA*
Correspondence: Rebecca Vasquez.
Email: Rebecca.Vasquez@utsouthwestern.edu

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Blistering severe cutaneous adverse reactions in children: proposal for paediatric-focused clinical criteria

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Dear Editor, Severe cutaneous adverse reactions (SCARs) are challenging to diagnose and manage in children for the following two main reasons: (i) the literature on SCARs in children is sparse and extrapolated from adult data and (ii) many paediatric blistering SCAR cases are qualified as 'atypical' or 'incomplete' erythema multiforme (EM), Stevens–Johnson syndrome (SJS) and toxic epidermal necrolysis (TEN) because certain clinical features prevent SCAR cases from fitting into this adult classification. Our panel proposes paediatric-focused clinical criteria for blistering SCARs in children in order to improve early diagnosis and facilitate acute management.

To review and illustrate our objective we briefly summarize current clinical criteria below. EM refers to a mild, self-limited but possibly recurrent, eruption of acral-predominant, classic raised target lesions without mucosal involvement that is often herpes simplex virus (HSV)-associated.[1] When associated with severe mucosal involvement, the term 'EM major' has been proposed.[2,3] Skin detachment triggered by medications or infections with mucositis affecting less than 10% of the body surface area (BSA) is known as SJS, when 10–30% BSA is affected it is classified as SJS-TEN overlap, and detachment affecting > 30% BSA is categorized as TEN.[4] Mucositis-predominant reactions to *Mycoplasma pneumoniae* (MP) respiratory tract infections are more common in children/adolescents and are termed 'MP-induced rash and mucositis'.[5] The spectrum of infections causing reactive mucositis has expanded to include non-MP bacteria and viruses, leading us to propose the term 'reactive infectious mucocutaneous eruption (RIME)' to encompass reactions triggered by MP and all other infection-triggered reactions.[6]

When the current clinical criteria are examined, there is potential overlap between EM and SJS as both involve mucositis and < 10% BSA cutaneous involvement.[4] RIME also involves prominent mucositis and limited cutaneous involvement, creating further overlap.[5,6]

Our panel of dermatologists and paediatric dermatologists conducted a literature review and then developed consensus definitions using a nominal group technique informed by the results of a survey of 28 paediatric dermatologists at the 2017 Pediatric Dermatology Research Alliance meeting. The survey asked participants to rank the five most important criteria for each diagnostic category.

We propose revised paediatric-specific clinical criteria for bullous SCAR cases as follows: EM for classic targets with/without mucosal involvement, RIME for cases with mucosal predominance and a respiratory infection trigger, and drug-induced epidermal necrolysis (DEN) for cases caused by medications. Each category has required, confirmatory and supportive criteria.

The predominant morphology of EM is the classic target that is raised, round, three-ringed and less than 3 cm in diameter with a bright red outer ring, pink and oedematous middle ring, and a dusky centre.[4] Fixed classic or atypical (two-ringed) raised targets are required to make the diagnosis of EM. To confirm the diagnosis, at least two of the following are necessary: recent history or laboratory evidence of HSV infection [IgM serology or polymerase chain reaction (PCR)], mucosal involvement, acral distribution, or lack of systemic symptoms. Features that may support the diagnosis of EM include recurrent episodes, individual lesions that last for at least 5 days and resolve without sequelae, and symmetrical distribution.

To make the diagnosis of RIME, evidence of an infectious trigger is required, which includes history of cough, fever, malaise, arthralgias in the preceding 7–10 days, clinical examination or investigations supporting a respiratory infection. Investigations comprise chest radiograph and laboratory tests for acute infection with respiratory viruses, MP, or *Chlamydophila pneumoniae* [culture or PCR of the naso/oropharynx, or