

with a history of atopic dermatitis, rosacea and contact dermatitis were found to be susceptible to dermatitis induced by masks.

The exact pathobiology of mask-induced dermatitis remains relatively unexplored. However, frequent friction, trapping of sweat and elevation of temperature may be the causative factors. Hua et al. showed that skin reaction to a mask is characterized by a compromised skin barrier function, as indicated by increased TEWL.³ Individuals with a history of atopic dermatitis, contact dermatitis and rosacea experienced compromised skin barrier function. Therefore, these people were more susceptible to increased temperature, extreme moisture and friction induced by their masks. Physicians need to educate the general population with a history of pre-existing dermatosis regarding their susceptibility to mask-induced dermatitis.

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S.J. Park,  H.S. Han,  S.H. Shin, K.H. Yoo, 
K. Li, B.J. Kim, S.J. Seo, K.Y. Park* 

Department of Dermatology, Chung-Ang University College of Medicine,
Seoul, Korea

*Correspondence: K.Y. Park. E-mail: kyky@caumc.or.kr

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Chilblain-like lesions after BNT162b2 mRNA COVID-19 vaccine: a case report suggesting that ‘COVID toes’ are due to the immune reaction to SARS-CoV-2

Editor

Several skin manifestations have been described in association with the COVID-19 pandemic since March 2020. Acral chilblain-like lesions (CBLL), usually referred to as ‘COVID toes’, are among the most common and characteristic ones, even though the direct causative role of SARS-CoV-2 has been debated. Indeed, although some authors have reported the detection of SARS-CoV-2 within the lesions with immunohistochemistry and electron-microscopy,^{1,2} the majority of patients with CBLL have had negative tests for SARS-CoV-2 (including serological tests and nasopharyngeal and *in situ*-skin PCR).³ A more likely hypothesis for the causation of CBLL in the setting of the COVID-19 pandemic is the development of a high interferon response to the virus, leading to a very efficient antiviral response and the development of CBLL, similar to the scenario observed in type 1 interferonopathies.^{4,5} The recent observations of CBLL following anti-SARS-CoV-2 vaccination in patients with no COVID-19 infection^{6,7} support this hypothesis. We present a new case of CBLL that developed shortly after vaccination with the BNT162b2 mRNA COVID-19 vaccine and discuss the significance of this and similar observations from the literature.

An 82-year-old non-smoker woman had a history of psoriasis and had been treated with methotrexate for more than 10 years. She had no history of chilblains or Raynaud’s syndrome. She denied any symptoms suggestive of COVID-19 since the beginning of the pandemic and had not been in contact with patients suffering from COVID-19. She consulted urgently in our department for slightly painful lesions on both hands and feet that occurred 24 h after the first injection of the BNT162b2 mRNA vaccine. Physical examination revealed macular violaceous and erythematous lesions of the fingers and toes, suggestive of CBLL (Fig. 1). The patient reported neither general symptoms nor unusual exposure to cold. Laboratory workup yielded normal results, concerning namely markers of inflammation, renal and hepatic function and tests for autoimmunity (antinuclear antibodies, cryoglobulinaemia, complement levels, D-dimers). Histological examination of a skin biopsy taken from a lesion of the hand showed a characteristic aspect of CBLL,⁸ including namely a partly necrotic epidermis overlying a dense dermal lymphocytic infiltrate forming rather well-circumscribed aggregates around blood vessels, eccrine sweat glands and occasionally



Figure 1 Characteristic aspect of chilblain-like lesions.

nerves (Fig. 2). The endothelial cells of the blood vessels of the mid dermis were occasionally prominent. Direct immunofluorescence performed on a frozen skin biopsy was negative. Serological test carried out early on day 19 after the 1st vaccination dose was negative, ruling out SARS-CoV-2 infection. A specific serological test for vaccinal anti-S antibodies was also realized and proved positive (6.38 U/mL, $N < 1$). The interferon signature in blood was positive (10.5, $N < 2.3$).

Skin reactions following administration of mRNA-based anti-SARS-CoV-2 vaccines have been very recently reported. They include mainly delayed large local reactions,⁹ reactions at the injection site and urticarial and morbilliform rashes.⁵ No severe reactions were associated with these skin signs. Interestingly, some cases of CBLL have also been reported within days following mRNA vaccination.^{6,7} In our patient, the clinical and histological features of the lesions were indistinguishable from the CBLL observed during the first pandemic wave in 2020. The absence of prior history of chilblains and exposure to cold argue against common chilblains. The development of CBLL after mRNA vaccination in our patient and some patients reported in the literature supports the hypothesis that these lesions are triggered by the immune response to the virus and not to a direct cytopathogenic viral effect. The presence of a positive interferon signature also supports this contention.

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The patient in this manuscript has given written informed consent to the publication of her case details.

Conflict of interest

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C. Lesort,^{1,*}  J Kanitakis,^{1,2}  L. Donzier,¹ D. Jullien¹ 

¹Dermatology Department, Edouard Herriot Hospital, Hospices Civils de Lyon, Lyon, France, ²Department of Anatomic Pathology, Lyon Sud Hospital Center, Pierre Bénite, France

*Correspondence: C. Lesort. E-mail: cecile.lesort@chu-lyon.fr

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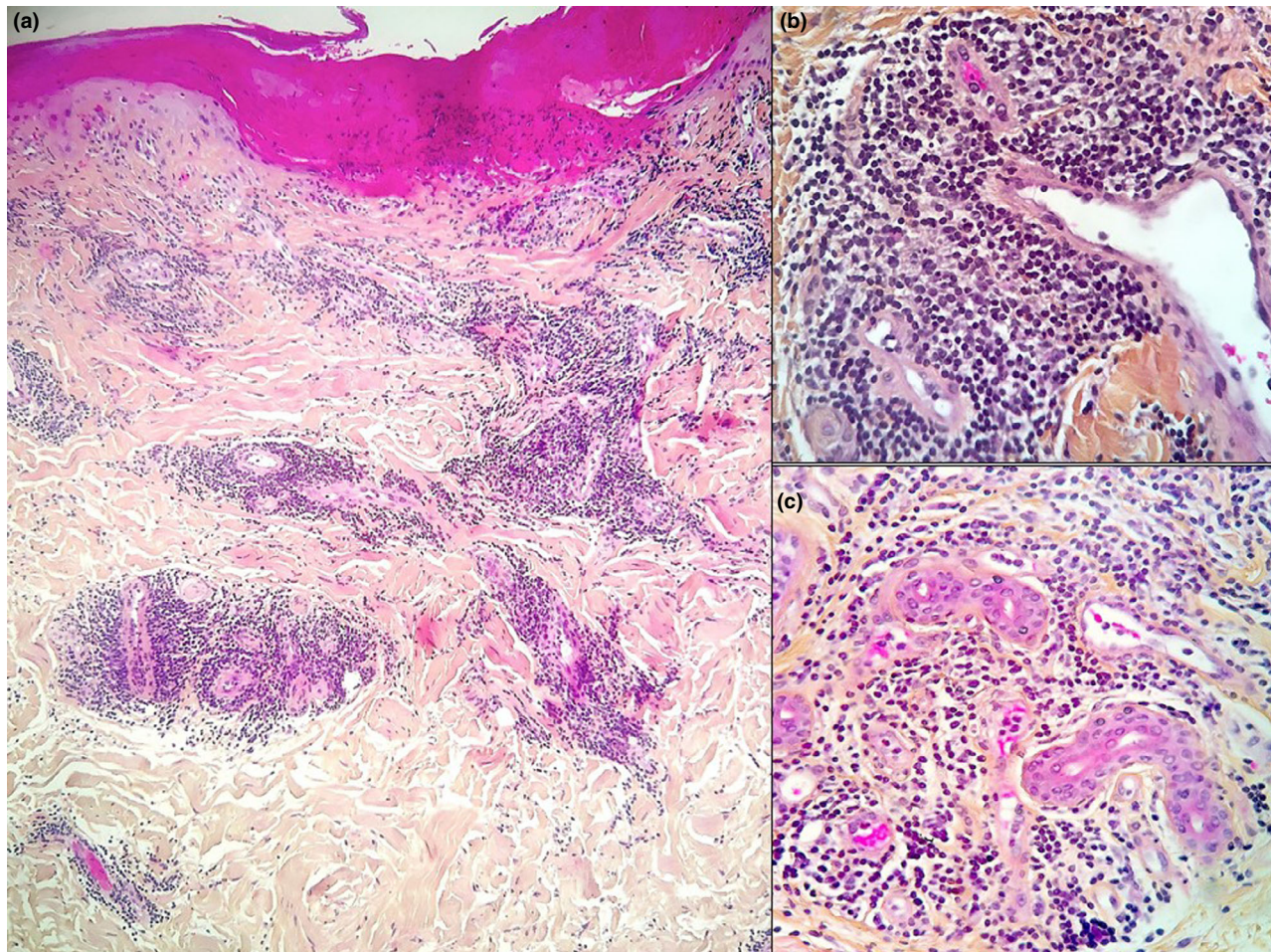


Figure 2 Microscopic examination of a skin biopsy of the lesion shown in Fig. 1 shows a partly necrotic epidermis and a dense dermal lymphocytic infiltrate (a) forming aggregates around blood vessels (b) and sweat glands (c) (haematoxylin–eosin–safran stain, original magnifications: a, $\times 100$; b, c, $\times 250$).

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Psoriasis flare-up associated with second dose of Pfizer-BioNTech BNT16B2b2 COVID-19 mRNA vaccine

A 46-year-old Caucasian man presented with psoriasis flare-up, which occurred a day after second dose of COVID-19 Pfizer-