Received: 7 August 2022 | Revised: 17 September 2022 | Accepted: 29 September 2022

DOI: 10.1002/cia2.12281

Journal of Cutaneous Immunology and Allergy

WILEY

CORRESPONDENCE

Adult-onset Still's disease following mRNA-1273 Moderna COVID-19 vaccination: A case report

Vaccination for severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is the most effective preventive method for coronavirus disease 2019 (COVID-19) pandemic and has been the focus of a worldwide campaign. The COVID-19 can induce systemic inflammation,[1] resulting in new onset or a flare-up of autoimmune rheumatic manifestations such as arthritis, lupus, myositis, and vasculitis.[2] Consequently, several immune-mediated diseases following COVID-19 vaccination have been reported.[3] Herein, we report a case of adult-onset Still's disease (AOSD) following mRNA COVID-19 vaccine administration.

A 57-year-old Japanese woman with no previous medical history was inoculated with a second dose of the mRNA-1273 Moderna COVID-19 vaccine. One week later, she experienced recurrent erythematous eruptions, which regressed spontaneously within a few days. Treatment with topical corticosteroids and oral antihistamines was ineffective, and the patient was referred to our department 3 weeks later. Physical examination confirmed 2–10 mm pruritic confluent erythematous papules and plaques on her trunk and extremities (Figure 1A, B). A sore throat, left axillary lymphadenopathy, proximal muscle myalgia, skin redness, pain, and swelling of the right thumb's interphalangeal (IP) joint and bilateral ulnar-sided wrists (Figure 1D–F) were also observed. A skin biopsy of the pruritic plaque on the back revealed vacuolar interface dermatitis with dyskeratosis in the upper epidermis (Figure 1C). SARS-CoV-2 reverse transcriptase-polymerase chain reaction testing was negative. Laboratory tests revealed slight elevations in C-reactive protein level (1.60 mg/dL; normal, ≤0.30 mg/dL), erythrocyte sedimentation rate (22 mm/h; normal, ≤11 mg/dL), and serum ferritin

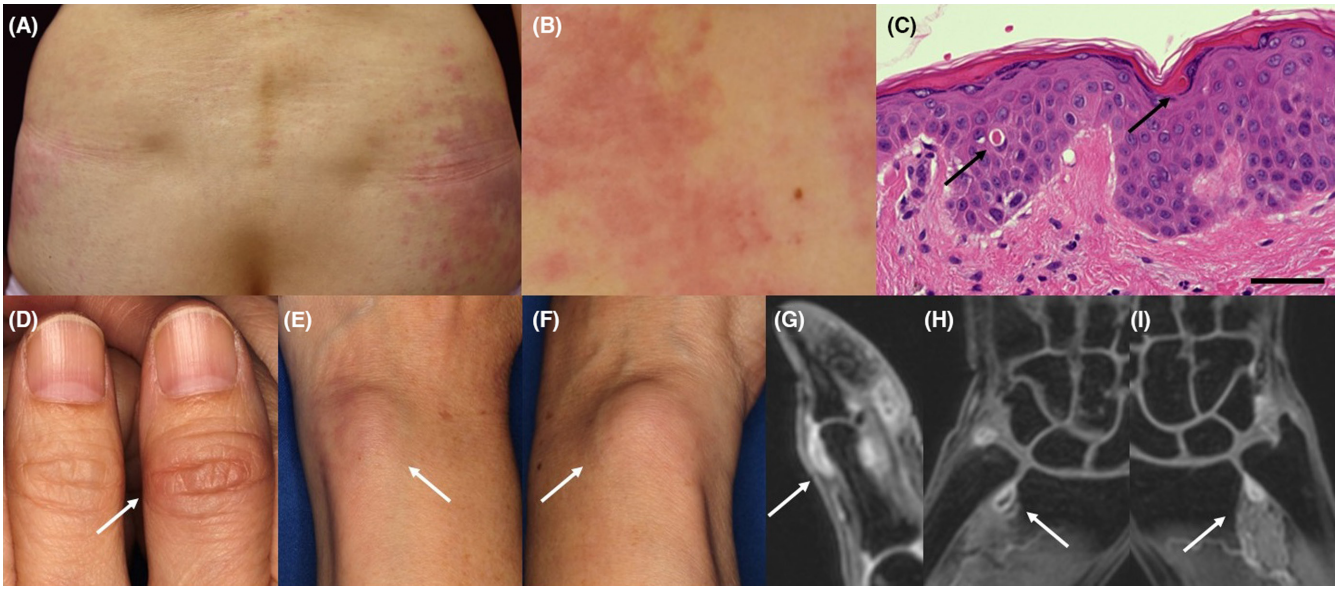

FIGURE 1 Clinical and pathological findings. (A) Multiple, 2–10 mm in size, confluent erythematous papules and plaques with intense itch present on the trunk and extremities. (B) Close-up view of the eruption. (C) Hematoxylin and eosin staining shows vacuolar change and lymphocytic infiltration at the dermoepidermal junction with dyskeratosis in the upper epidermis (black arrows). The bar represents 50 μm. (D–F) A skin redness, swelling, and pain on the interphalangeal (IP) joint of right thumb and bilateral ulnar-sided wrists (white arrows). (G–I) Contrast-enhanced magnetic resonance imaging (modified DIXON) shows synovial thickening with strongly enhanced high intensity of IP joint of right thumb and bilateral distal radioulnar joints (white arrows).

(1083 ng/mL; normal, ≤114 ng/mL) with a normal white blood cell count. Serological examinations for autoimmune diseases (e.g., antinuclear antibody, rheumatoid factor, anticyclic citrullinated peptide-antibody, anti-double-stranded DNA-antibody, anti-Smith antibody, anti-aminoacyl tRNA synthetase-antibody, anti-Mi-2-antibody, anti-transcriptional intermediary factor 1-γ-antibody, and anti-melanoma differentiation-associated gene 5-antibody) and infections (e.g., human immunodeficiency virus, hepatitis B virus, hepatitis C virus, parvovirus B19, syphilis, and *Streptococcus*) were negative. Contrast-enhanced magnetic resonance imaging (MRI) revealed synovitis of the IP joint of the right thumb and bilateral distal radioulnar joints (Figure 1G–I). Echocardiography and contrast-enhanced MRI revealed no pericarditis. Based on these findings, the patient was diagnosed with AOSD according to Yamaguchi's criteria.[4] Treatment with celecoxib was initiated but discontinued after a week following drug-induced erythema multiforme. Subsequent treatment with topical corticosteroids improved drug eruption within 1 week. Administration of methotrexate (8 mg per week) slightly improved the skin lesions and arthralgias.

The etiology of AOSD is unclear; however, pathogen-associated-(PAMPs) or damage-associated molecular patterns may activate the immune system in genetically predisposed patients,[5] leading to interleukin (IL)-1β and IL-18 overproduction, known as a cytokine storm.[5] The SARS-CoV-2 spike proteins, envelope proteins, and viral RNA are potent PAMPs, whereas the nucleocapsid proteins can block IL-1β release.[1] The mRNA COVID-19 vaccines encode spike proteins but not nucleocapsid proteins, and thus may disturb the host immune system.

The underlying pathophysiology of COVID-19 vaccine-induced AOSD remains elusive. We believe that our report will contribute to the better management of the side effects of COVID-19 vaccines for their timely diagnosis and treatment.

CONFLICT OF INTEREST

The authors declare no conflicts of interest.

DECLARATION SECTION

Approval of the research protocol: N/A.

Informed Consent: The patient diagnosed at Tsukuba University Hospital was included in this study with written informed consent.

Registry and the Registration No: N/A.

Animal Studies: N/A.

Masahiro Iwata MD[1]
Tatsuya Ogawa MD, PhD[1]
Keisuke Anju MD[1]
Naoko Okiyama MD, PhD[1,2]
Toshifumi Nomura MD, PhD[1]

[1]*Department of Dermatology, Faculty of Medicine, University of Tsukuba, Ibaraki, Japan*
[2]*Department of Dermatology, Graduate School of Medical and Dental Sciences, Tokyo Medical and Dental University, Tokyo, Japan*

Correspondence
Tatsuya Ogawa, Department of Dermatology, Faculty of Medicine, University of Tsukuba, 1-1-1 Tennodai, Tsukuba, Ibaraki 305-8575, Japan.
Email: ogawa.tatsuya.hp@ms.hosp.tsukuba.ac.jp

ORCID

Masahiro Iwata https://orcid.org/0000-0002-0581-5562
Tatsuya Ogawa https://orcid.org/0000-0003-1124-4572
Naoko Okiyama https://orcid.org/0000-0002-5398-0773
Toshifumi Nomura https://orcid.org/0000-0002-9954-6446

REFERENCES

1. Diamond MS, Kanneganti TD. Innate immunity: the first line of defense against SARS-CoV-2. Nat Immunol. 2022;23(2):165–6.
2. Ahmed S, Zimba O, Gasparyan AY. COVID-19 and the clinical course of rheumatic manifestations. Clin Rheumatol. 2021;40(7):2611–9.
3. Chen Y, Xu Z, Wang P, Li XM, Shuai ZW, Ye DQ, et al. New-onset autoimmune phenomena post-COVID-19 vaccination. Immunology. 2022;165(4):386–401.
4. Yamaguchi M, Ohta A, Tsunematsu T, Kasukawa R, Mizushima Y, Kashiwagi H, et al. Preliminary criteria for classification of adult Still's disease. J Rheumatol. 1992;19(3):424–30.
5. Feist E, Mitrovic S, Fautrel B. Mechanisms, biomarkers and targets for adult-onset Still's disease. Nat Rev Rheumatol. 2018;14(10):603–18.