

SARS-COV-2 MRNA vaccine-associated cutaneous vasculitis

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ABSTRACT

During the coronavirus disease 2019 pandemic, global approach was to isolate populations with quarantine procedures to reduce the spread of this deadly virus until effective treatments are found or vaccines are developed. mRNA-based vaccines became available in the United States in March 2020. The Food and Drug Administration even issued an Emergency Use Authorization for individuals 16 years and older in December 2020. However, these rapid developments have brought along other problems such as possible side effects. As we develop and test a new treatment, it became clear how important side-effect management is. Here, we present a case of cutaneous vasculitis that developed on the fourth day of SARS-CoV-2 mRNA vaccination. The patient was successfully treated with medium-dose methylprednisolone.

Keywords: COVID-19 vaccine; cutaneous vasculitis; leukocytoclastic vasculitis; mRNA vaccines; SARS-CoV-2 virus.

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Cutaneous vasculitis (CV) can occur either idiopathic or secondary to triggers such as drugs and vaccines. Although the diagnosis of CV is difficult, it can distinguish by anamnesis, diagnostic algorithms, skin biopsy, and laboratory testing (including the search for antineutrophil cytoplasmic antibodies to exclude systemic vasculitis). Our patient has presented with bilateral knee and ankle arthritis with petechia and non-palpable purpura of the lower extremities on the 4th day of the SARS-CoV-2 mRNA vaccine.

CASE REPORT

A 38-year-old male patient was admitted to the outpatient clinic with a skin rash on his lower limbs and joint pain in both knees and ankles (Fig. 1, 2A). Regarding his medical history, he was otherwise healthy until vaccinated with the Pfizer-BioNTech coronavirus

disease 2019 (COVID-19) Vaccine 4 days ago. He has no history of drug usage and chronic disease in the family. The patient was treated with non-steroidal anti-inflammatory drugs and anti-histamines firstly as it was thought hypersensitivity reaction but he did not respond to the 1-week course of treatment. After multidisciplinary consultations with dermatology and rheumatology, cutaneous vasculitides are also considered and a core biopsy of the skin was decided. To exclude, systemic vasculitides immunological markers were also tested. Laboratory results showed: Hemoglobin: 15 g/dL, mean corpuscular volume: 87 fl, platelet: 322×10^3 uL, white blood cell: 11×10^3 uL, ferritin: 88.6 mL/ng, glucose: 87, urea: 33 mg/dL, creatinine: 0.6 mg/dL, calcium: 10.1 mg/dL, c-reactive protein: 12.2 mg/L, and sedimentation rate: 31 mm/h. In the urine analysis, glucose, leukocytes, and protein were negative. Total protein was 7.36 g/dL and serum protein electrophore-



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FIGURE 1. Purpuric rash on the lower extremities.

sis distribution in main fractions; albumin: 4.85 (65%), alpha 1: 0.3 g/dL (4.13%), alpha 2: 0.5 g/dL (6.81%), beta 1: 0.38 g/dL (5.19%), beta 2: 0.27 g/dL (3.64%), gamma: 1.05 g/dL (14.33%) were normal. Antinuclear antibody, rheumatoid factor, anti-citrullinated protein, anti-double-stranded DNA, complement component 3–4, ENA profile, ANCA profile, and viral markers for hepatitis were also negative. Imaging (chest X-ray, echocardiography, and ultrasound of the abdomen) yielded normal results. Punch biopsy from the right leg resulted in vascular proliferation in the dermis, fibrinoid collection, and neutrophilic infiltration in the vascular walls, perivascular lymphocytic, histiocytic, eosinophilic, neutrophilic infiltration, and leukocytoclasia. Immunofluorescence showed no IgG, IgM, IgA, C3, or fibrinogen collection as well a leukocytoclastic vasculitis diagnosis is made and 24 mg methylprednisolone was started. In the 1st week of treatment, the patient responded well and become symptom-free.

Outcome and Follow-up

Antihistamines and non-steroidal anti-inflammatory drugs were not helpful, but a 1-week treatment of 24 mg methylprednisolone was quite effective (Fig. 2B). The patient was given a steroid dose reduction scheme, and no significant side effects were observed during the treatment. The patient was advised not to receive the second dose of the vaccine.

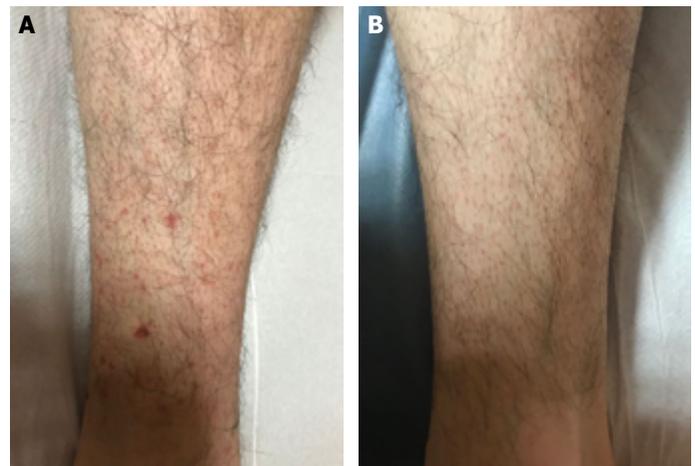


FIGURE 2. (A) Rash on the lower limbs. **(B)** Lower extremities after treatment.

DISCUSSION

Here, we report a case of CV that developed on the 4th day of the SARS-CoV-2 mRNA vaccine and was successfully treated with corticosteroids. In a multicenter study, 414 skin reactions to mRNA COVID-19 vaccines from Moderna (83%) and Pfizer (17%) were recorded. Delayed type-wide local reactions, local injection site reactions, urticaria, and morbilliform reactions are most common in cutaneous reactions to mRNA vaccines. Less common reactions, pernio/chilblains, zoster, herpes simplex, pityriasis rosea-like reactions, and vasculitides have been reported [1]. Most of the patients with cutaneous reactions after the first dose did not relapse after the second dose. Patients responded well to oral or topical antihistamines, pain relievers, and corticosteroids. These reactions resolved in an average of 3–4 days and antibiotics were not required [1]. In addition to the side effects of mRNA vaccines, we informed that the COVID-19 virus itself has dermatological symptoms. In a comprehensive systematic review comparing data from 86 studies of COVID-19 skin involvement, the most common findings were chilblains/pernio-like lesions, erythematous maculopapular rash, viral exanthema, and urticaria which were self-limited and resolved within 2 weeks [2]. In addition, two cases of CV associated with COVID-19 infection have been reported in the literature [3,4].

Conclusion

There are significant challenges in developing mRNA vaccines as quickly as possible to control COVID-19. Studies show us that both the COVID-19 virus and

mRNA vaccines can cause skin reactions. Our case of CV was one of the rarest dermatological manifestations of the COVID-19 mRNA vaccine. We treated our patients with moderate doses of steroids without any complications. Our experience with the new COVID-19 vaccines is limited so further investigations and observations are required.

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