Brief Report Annals of Dermatology 2023;35(Suppl 2):S332-334 • https://doi.org/10.5021/ad.21.212

Leukocytoclastic Vasculitis Following Vaccination against Coronavirus Disease 2019

Dongchan Kim, You Chan Kim

Department of Dermatology, Ajou University School of Medicine, Suwon, Korea

Dear Editor:

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) is a major public health concern worldwide. With the increasing number of individuals receiving coronavirus disease 2019 (COVID-19) vaccines, various adverse events are being reported[1,2]. Here, we present two cases of leukocytoclastic

Fig. 1. Physical examination findings of case 1 (A~C) and case 2 (D~F). (A, B) The image shows diffuse bilateral erythematous patches with multiple painful purpuric macules and papules on the lower legs. (C) Steroid therapy almost completely resolves the skin lesions after one month. (D, E) The image reveals multiple bilateral erythematous-to-violaceous painful palpable purpura and hemorrhagic crusts on the lower legs. (F) Steroid and colchicine therapy significantly improves the skin lesions with residual hyperpigmentation after five weeks.

Received September 9, 2021 **Revised** October 26, 2021 **Accepted** November 17, 2021

Corresponding Author
You Chan Kim
Department of Dermatology, Ajou University Hospital, Ajou University School of Medicine, 164 WorldCup-ro, Yeongtong-gu, Suwon 16499, Korea
Tel: +82-31-219-5190, Fax: +82-31-219-5189, E-mail: maychan@ajou.ac.kr
https://orcid.org/0000-0003-4840-594X

vasculitis (LCV) following COVID-19 vaccination in patients without the relevant underlying conditions.

A previously healthy 59-year-old man presented with new-onset rashes and swelling after seven days of receiving the first dose of Oxford/AstraZeneca vaccine. He took only acetaminophen (500 mg) for injection site pain 2 days after vaccination. He had no recent upper respiratory infection. Physical examination revealed diffuse erythematous patches with multiple painful purpuric maculopapules on the both lower legs (Fig. 1A, B). Laboratory examinations, including complete blood count (CBC), coagulation test, liver function test (LFT), C-reactive protein (CRP) levels, and urinalysis, were unremarkable. Histopathologic examination taken from a purpuric papule showed perivascular neutrophilic infiltration with numerous karyorrhexis (Fig. 2A, B) and we did not perform direct immunofluorescence (DIF) test. Treatment with topical steroid and oral prednisone with gradual dose tapering for a month almost resolved his skin lesions (Fig. 1C) and he refused to receive the second vaccination.

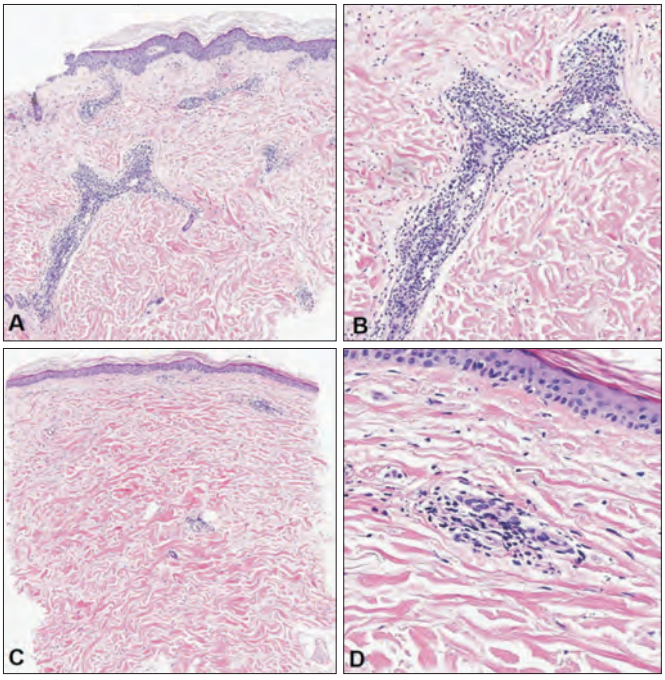

Fig. 2. Histopathologic examination of biopsy specimens of case 1 (A, B) and case 2 (C, D) stained with hematoxylin and eosin (H&E). (A) The micrograph shows perivascular inflammatory infiltrates with an angiocentric pattern (H&E, ×100). (B) The image reveals predominant neutrophilic infiltration in the walls of small vessels with numerous nuclear dusts. (H&E, ×200). (C) The micrograph shows superficial perivascular inflammatory infiltration (H&E, ×100). (D) The image demonstrates leukocytoclasia with inconspicuous erythrocyte extravasation and vascular fibrinoid necrosis (H&E, ×400).

An 87-year-old woman with hypertension and hyperlipidemia presented with a 12-day history of progressive bilateral skin lesions on the legs that developed seven days after receiving the first dose of Pfizer–BioNTech vaccine. Acetaminophen (500 mg) was administered for pain at the injection site 2 days after vaccination. The patient denied taking any other medication and had no recent cough or throat pain. Physical examination demonstrated multiple bilateral erythematous-to-violaceous painful palpable purpura and hemorrhagic crusts on the lower legs (Fig. 1D, E). Laboratory examinations (i.e., CBC, LFT, coagulation test, erythrocyte sedimentation rate, CRP level, and urinalysis) were unremarkable. Histopathologic examination of a biopsy specimen showed LCV (Fig. 2C, D) and we did not perform DIF test. Treatment with oral prednisone, colchicine, and topical steroid significantly improved the skin lesions with residual hyperpigmentation after five weeks (Fig. 1F) and she refused to receive the second vaccination.

LCV refers to the inflammation of the small vessels in the skin that can be triggered by certain drugs or vaccines[3]. In our case, acetaminophen is also implicated as a trigger for LCV, but patients have never had problems with acetaminophen before. Because drug-induced vasculitis most often occurs 7 to 10 days after administration of a new medication[4,5], the exact dates of inoculation and symptom onset are crucial to determine the potential etiology of vasculitis[3].

COVID-19 vaccination has been shown to aggravate pre-existing LCV[4,5]. Although the exact pathophysiologic mechanism of vaccine-induced LCV is still unclear, aberrant immune response to the SARS-CoV-2 spike protein following vaccination is implicated[1,4]. It should be noted that most patients who had adverse reactions after the first dose did not experience side effects after the second dose[1,2]. However, in patients with autoimmune diseases, more serious reactions could occur[4,5].

Our case suggested a potential link between COVID-19 vaccines and LCV. To determine a more precise causal relationship, further investigations are necessary to confirm.

ACKNOWLEDGMENT

We received the patient's consent form about publishing all photographic materials.

CONFLICTS OF INTEREST

The authors have nothing to disclose.

FUNDING SOURCE

None.

ORCID

Dongchan Kim, https://orcid.org/0000-0003-3763-0746
You Chan Kim, https://orcid.org/0000-0003-4840-594X

REFERENCES

1. McMahon DE, Amerson E, Rosenbach M, Lipoff JB, Moustafa D, Tyagi A, et al. Cutaneous reactions reported after Moderna and Pfizer COVID-19 vaccination: a registry-based study of 414 cases. J Am Acad Dermatol 2021;85:46-55.
2. Robinson LB, Fu X, Hashimoto D, Wickner P, Shenoy ES, Landman AB, et al. Incidence of cutaneous reactions after messenger RNA COVID-19 vaccines. JAMA Dermatol 2021;157:1000-1002.
3. Loricera J, Blanco R, Ortiz-Sanjuán F, Hernández JL, Pina T, González-Vela MC, et al. Single-organ cutaneous small-vessel vasculitis according to the 2012 revised International Chapel Hill Consensus Conference Nomenclature of Vasculitides: a study of 60 patients from a series of 766 cutaneous vasculitis cases. Rheumatology (Oxford) 2015;54:77-82.
4. Cohen SR, Prussick L, Kahn JS, Gao DX, Radfar A, Rosmarin D. Leukocytoclastic vasculitis flare following the COVID-19 vaccine. Int J Dermatol 2021;60:1032-1033.
5. Obeid M, Fenwick C, Pantaleo G. Reactivation of IgA vasculitis after COVID-19 vaccination. Lancet Rheumatol 2021;3:e617.