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LETTERS TO THE EDITOR

Pigmented purpuric dermatosis after BNT162B2 mRNA COVID-19 vaccine administration

Dear Editor,

Several cutaneous adverse reactions (ARs) secondary to COVID-19 vaccines have been reported after emergency use authorization of the coronavirus disease 2019 (COVID-19) vaccines. Most of the reported ARs reported as erythema, edema, and tenderness at injection site which are expectedly seen after any vaccine administration.[1] Furthermore, other dermatologic inflammatory dermatologic conditions including pityriasis rosea, urticaria, purpuric eruption, cutaneous vasculitis, systemic lupus erythematosus, flare of guttate psoriasis, erythema multiforme, lichen planus, reactions to dermal fillers, secondary reactions that mimic severe acute respiratory distress syndrome coronavirus 2 (SARS-CoV-2) cutaneous manifestations such as pernio/chilblains or vesicular eruptions have been reported[2–7] as immune ARs. To our knowledge, there is one case of pigmented purpuric dermatosis (PPD), purpura annularis telengiectoides subtype reported in the literature secondary to COVID-19 vaccine.[8] Herein, we report the second case of PPD developed 18 days after BNT162B2 vaccine in a young male patient without past medical history of any skin condition.

A 37-year-old male patient presented with nonpruritic eczematous lesions on his arms and legs. The patient reported nonpainful, slowly progressing lower leg rash which was present for 4 days. He had 1st dose of BNT162B2 vaccine 18 days ago. He reported local pain and erythema which lasted for 1–2 hours after vaccine administration and did not require treatment including nonsteroidal anti-inflammatory medications. He denied any systemic/dermatological diseases in the past and medication use in the last 8 weeks. He has never been diagnosed with COVID-19.

Physical examination showed grouped cayenne-pepper like pigmented purpuric lesions on the bilateral legs and right arm (Figure 1A). Dermatoscopic examination of the lesions revealed red dots-clods on a coppery-red background (Figure 2A). Complete blood cell count, basic metabolic panel, complement, C-reactive protein, D-dimer levels, sedimentation rate, and coagulation studies were within normal ranges. Antinuclear antibody, rheumatoid factor, HIV, and hepatitis studies were negative. Peripheral blood smear did not show any abnormality. Urinalysis did not show proteinuria or hematuria. SARS-Cov-2 polymerase chain reaction testing from throat swab was negative. Doppler study of the lower extremities was negative for thrombosis or venous insufficiency.

Skin biopsy from the leg lesion showed mild spongiosis and lymphocyte exocytosis in the epidermis; interface change in the

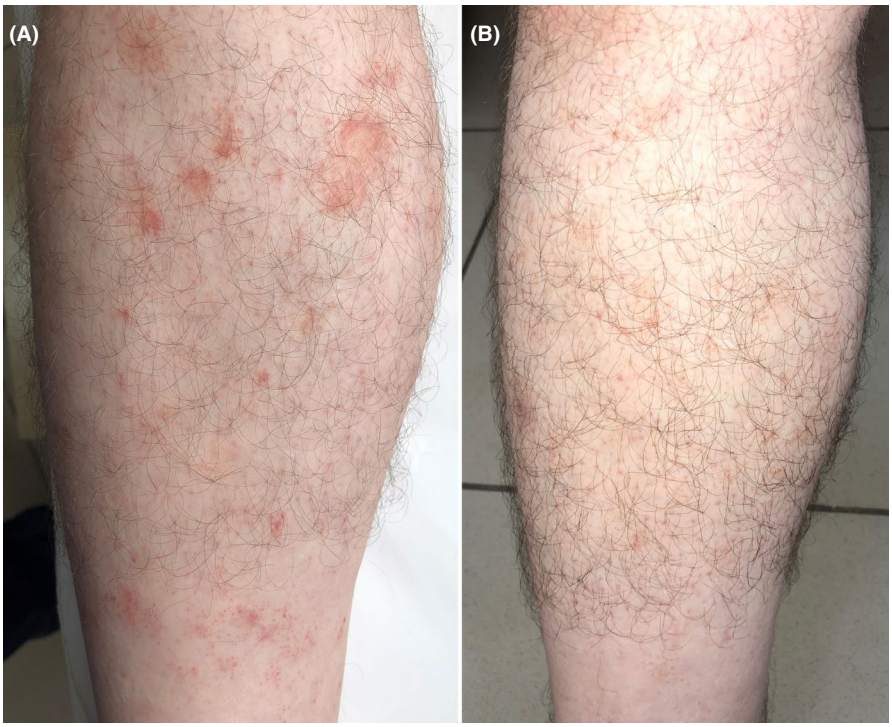

FIGURE 1 (A and B) Clinical image of the lesion located on the right anterior shin at the time of presentation (A) and after treatment (B)

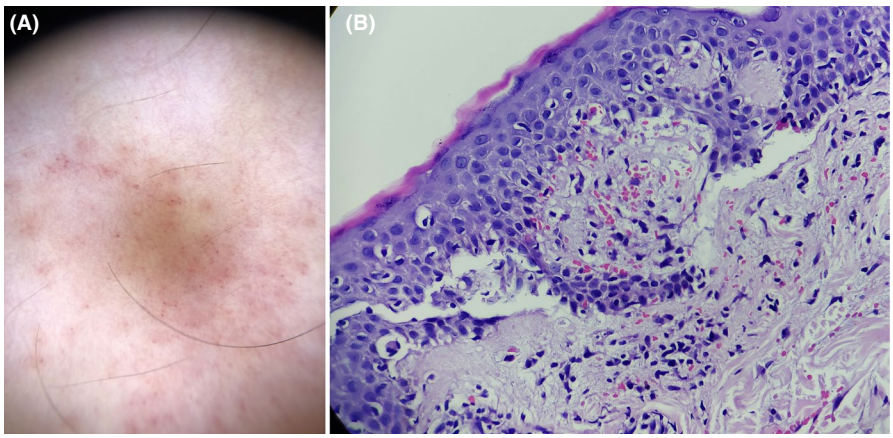

FIGURE 2 (A) Dermatoscopic image of the lesion showing red dots-clods on a coppery red background. (B) Histologic image from the lesion showing a spongiotic epithelium with lymphocyte exocytosis and interface change at the dermo-epidermal junction. Perivascular lymphocytic infiltrate, erythrocyte extravasation, and endothelial cell swelling are seen in dermal capillaries, H&E 40×

dermo-epidermal junction; lymphocytic perivascular infiltration, endothelial cell swelling, and red blood cell extravasation in the dermis (Figure 2B). Additionally, immunohistochemical studies for CD4 and CD8 were done to rule out mycosis fungoides considering lymphocyte exocytosis in the epidermis, which showed negative results. Unfortunately, we were not able to do electron microscopic examination to visualize viral particles in the tissue due to lack of availability. Eventually, the patient has been diagnosed with PPD and was given topical mometasone furoate, vitamin C 1 gr/day, and pentoxifylline 400 mg twice daily. The lesions regressed within 3 weeks (Figure 1B). The patient had 2nd dose of COVID-19 vaccine 6 weeks after 1st dose; he did not have any recurrent lesions.

Pigmented purpuric dermatosis is a chronic benign, self-limiting cutaneous eruption. Venous stasis, infections, contact allergens, medications, and systemic diseases have been implicated in the pathogenesis. Although etiopathogenesis of PPD is not well-understood, cell-mediated immunity has been implicated.[9] Histologic specimens of PPD show a mononuclear inflammatory infiltrate of varying extend and are conceivable to cause capillary damage and erythrocyte leakage in the tissue.[10]

Immunologic AEs due to newly developed COVID-19 vaccines have been reported including vasculitis, serum sickness-like reaction, erythema multiforme, and Stevens-Johnson syndrome.[1] BNT162B2 mRNA vaccine consists of mRNA component that mimics SARS-Cov-2 spike proteins. This mimicry, immune cross-reactivity, and hypersensitivity to vaccine components may lead to endothelial damage and erythrocyte extravasation, thus causing PPD. Previously, a case of widespread purpura annularis telengiectoides has been reported after COVID-19 vaccine administration.[8] The same mechanism of hypersensitivity reaction to mRNA COVID-19 vaccine may be the cause of PPD in our case and should not obstruct vaccine administration in patients without signs of systemic involvement who develops PPD after vaccine administration.

IRB APPROVAL

N/A.

KEYWORDS

BNT162B2 mRNA vaccine, COVID-19 vaccine, cutaneous adverse event, pigmented purpuric dermatosis, Schamber disease

CONFLICT OF INTEREST

Babar K. Rao is a consultant for CaliberID (manufacturer of the VivaScope). Other authors have no conflict of interest to declare.

AUTHOR CONTRIBUTIONS

Mehmet Fatih Atak involved in conceptualization, data acquisition, formal analysis, methodology, resources, validation, writing-original draft, and writing-review and editing. Banu Farabi involved in methodology, resources, supervision, validation, writing-original draft, and writing-review and editing. Mehmet Berati Kalelioglu involved in data acquisition and resources. Babar K. Rao involved in writing-review and editing and revision of the content.

ETHICAL APPROVAL

This material is the authors' own original work, which has not been previously published elsewhere. The paper is not currently being considered for publication elsewhere. The paper reflects the authors' own research and analysis in a truthful and complete manner. The paper properly credits the meaningful contributions of co-authors and co-researchers. The results are appropriately placed in the context of prior and existing research. All sources used are properly disclosed (correct citation). Literally copying of text must be indicated as such by using quotation marks and giving proper reference. All authors have been personally and actively involved in substantial work leading to the paper, and will take public responsibility for its content.

DATA AVAILABILITY STATEMENT

The authors confirm that the data supporting the findings of this study are available within the article.

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