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Case Report

Morbilliform Eruption Post Pfizer-BioNTech COVID-19 Vaccination: A Case Report and Future Recommendations

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Abstract

A man in his 80's presented with a 1-month history of pruritic morbilliform rash over his upper and lower extermities, sparing the trunk and face. It started after 3 days of receiving the 1st dose of Pfizer-BioNTech COVID-19 vaccine and worsened few hours after receiving the 2nd dose of the vaccine. He did not improve on high potent topical corticosteroid, nor by combining 2 types of antihistamines. Despite there was a noticeable improvement of his symptoms after receiving a short course of oral corticosteroid, the same morbilliform rash ascended from the distal parts of his extremities to involve the proximal parts, and then gradually improved after 3 weeks. Histopathology reported signs of dermatitis, no features of vasculitis were noted and DIF was negative. We believe that the ascending of the rash is a unique finding in our case, moreover, our patient had a relatively longer time to reach full recovery from this adverse event.

ABBREVIATIONS

COVID-19: Coronavirus disease 2019; EAU: Emergency Use Authorization; NSAIDs: Non-Steroidal Anti-inflammatory drugs; OD: Once Daily; DM: Diabetes Mellitus; HTN: Hypertension; DLP: dyslipidemia; DIF: Direct Immunofluorescence; H&E: Hematoxylin and eosin stain; CBC: Complete Blood Count; ANCA: Anti-neutrophil cytoplasmic antibodies

INTRODUCTION

The rapid spread of SARS-CoV-2 virus with the ongoing COVID-19 outbreak has resulted in the global pandemic since late 2019. Up to this date, 17 December 2022, it led to over 647 million cases and approximately 6.6 million deaths of COVID-19 worldwide [1]. This led to an urgency to develop a vaccine promptly to decrease the morbidity and mortality associated with this disease. On December 11, 2020, the U.S. Food and Drug Administration issued the first emergency use authorization (EUA) for Pfizer/BioNTech vaccine for the prevention of COVID-19 [2]. This vaccine has a novel technology of administration; mRNA encoding the SARS-CoV-2 spike protein that encodes the SARS-CoV-2 enveloped in lipid nanoparticles, then, it penetrates the cell through the cell membrane and produces spike protein for triggering immune system [3]. Although this new technology is claimed to be safe in general, the adverse effects of such technology in vaccinations are not yet fully studied. Cutaneous adverse effects after receiving mRNA-based vaccines have been reviewed from COVID-19 vaccine trial data [4], moreover; they were reported in a registry-based study [5]. Herein, we report a case of pruritic morbilliform eruption that developed over extremities after receiving each dose of the Pfizer-BioNTech COVID-19 vaccine. Also, we provided several future recommendations that can be considered when observing similar adverse reactions or planning for booster doses of the vaccine.

CASE PRESENTATION

Patient information

A man in his 80's presented with a 1-month history of persistent pruritic skin rash that started over the dorsa of both feet and progressed to involve the shins and forearms, sparing the trunk and face. The appearance of the rash was preceded by receiving the 1st dose of the Pfizer-BioNTech COVID-19 vaccine, 3 days before the onset of the symptoms. There was no associated fever, joint pain, headache, fatigue, or myalgia. Other systemic reviews were unremarkable. He was prescribed oral fexofenadine 180mg OD, topical clobetasol, hydrocortisone/miconazole, and fusidic acid from a private clinic. No other medications such as analgesics, antipyretics or NSAIDs were used between vaccination after the onset of the rash. Nevertheless, minimal improvement was reported with persistence of the itchiness and rash. After 21 days, he received the 2nd dose of the vaccine and his symptoms became more intense few hours after the administration. He was prescribed an additional oral antihistamine, cetirizine 10mg OD. He was known to have diabetes mellitus (DM), hypertension (HTN), and dyslipidemia (DLP). His regular medications include: Insulin, Atorvastatin 10mg OD, Valsartan 160mg OD, vitamin

B supplement OD, Aspirin 81mg OD, solifenacin 5mg OD, tamsulosin 0.4mg OD, spironolactone 25mg OD and Pantoprazole 20mg OD. No recent modifications have been made to his regular medications nor their regimens prior to the onset of his symptoms. He had no known history of drug, food or other types of allergies. No similar complaints were reported in his family.

Clinical findings

His skin examination revealed multiple well-defined erythematous papules, some coalescing into plaques, there were also some petechial lesions with areas of post-inflammatory hyperpigmentation over the shins of both legs [Figure 1,A] and dorsa of the feet. Some violaceous macules were observed over the toes, which likely represent perniosis [Figure 1,B]. Moreover, there were faint poorly defined pink/erythematous papules and plaques over the dorsa of both hands and forearms [Figure 1,C].

Diagnostic Assessment

Two 3mm skin punch biopsies were obtained from fresh lesions over the left leg and sent for Direct Immunofluorescence (DIF) and Hematoxylin and eosin stain (H&E) staining. Histopathology reported superficial and deep dermal perivascular dense lymphocytic infiltrate with scattered rare eosinophils [Figure 2[. No features of vasculitis were noted and DIF was negative. Other routine blood tests such as, CBC with differentials, coagulation profile, urine analysis, renal function test and liver function test were within normal ranges.

Therapeutic intervention

We prescribed 20mg oral prednisolone for seven days.

Follow-up and outcomes

On 1st follow-up visit after 10 days, we observed improvement in the previously affected sites. However, the same pruritic morbilliform rash had ascended to other areas; the thighs and elbows. On examination, pink to erythematous plaques were observed over both thighs and elbows [Figure 3 A,B[. On 2nd follow-up after 3 weeks, the patient stated that his condition had gradually improved regarding the itchiness and rash.]

DISCUSSION

Cutaneous adverse reactions post COVID-19 vaccination with diverse data on timing and morphology were reported [5]. Out of 71 reported cases who received Pfizer vaccine, the most reported cutaneous adverse events were urticaria and local injection site reaction followed by morbiliform rash. Similarly, out of 343 reported cases who received Moderna vaccine, the most common reported cutaneous reactions were local reactions, local injection site reactions, urticaria, morbilliform, and erythromelalgia respectively. The median time of experiencing those reactions was 7 days after the 1st dose and 1-2 days after the 2nd dose.

Our patient developed a morbilliform rash after 3 days of receiving the 1st dose of Pfizer vaccine; nevertheless, he was advised by a dermatologist from a private clinic to proceed with the 2nd dose of the vaccine, as was scheduled, with no additional precautions. He, consequently, had worsening of the existing rash and itchiness few hours after receiving the 2nd dose. At the time of presenting to our clinic and based on the clinical picture of his rash, we initially obtained skin biopsy in order to rule out the provisional diagnosis of cutaneous vasculitis. Other relevant blood tests such as, ANCA, complements level, D-dimer was discussed to be requested in case the histopathological report was suggesting vasculitis. Otherwise, tests for potential allergic sensitization to vaccine components such as, patch test and skin prick test were suggested to be performed in the future follow-up visits. However, the histopathological report excluded vasculitis.

There was no improvement in his condition after applying high potent topical corticosteroid that was prescribed elsewhere,

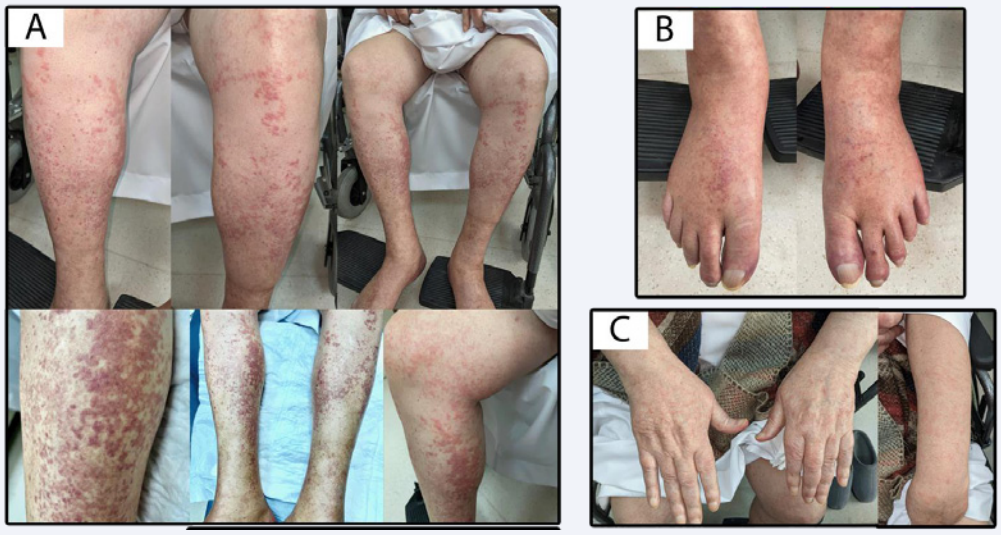

Figure 1 At first visit: A Over the shins of both legs there are multiple well-defined erythematous papules, some coalescing into plaques, and there are also some petechial lesions. B Over the dorsa of the feet, there are multiple petechial lesions and purpuric papules as well as areas of post-inflammatory hyperpigmentation. In addition, there are violaceous macules over the toes. C Over the dorsum of the hand and the forearms there are faint poorly defined pink/erythematous papules and plaques.

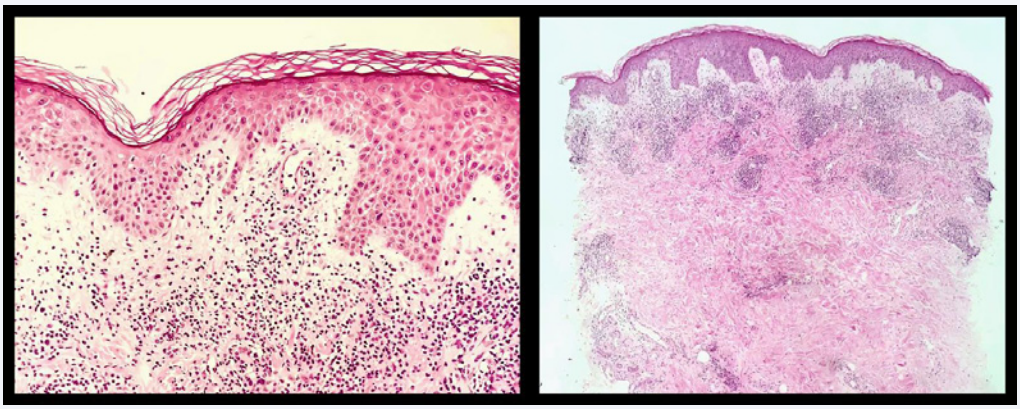

Figure 2 A punch biopsy specimen of front leg. Skin demonstrated epidermal spongiosis with dermal edema, and superficial and deep perivascular and interstitial lymphohistiocytic and eosinophilic cell infiltrate (Hematoxylin & Eosin 40x and 200x).

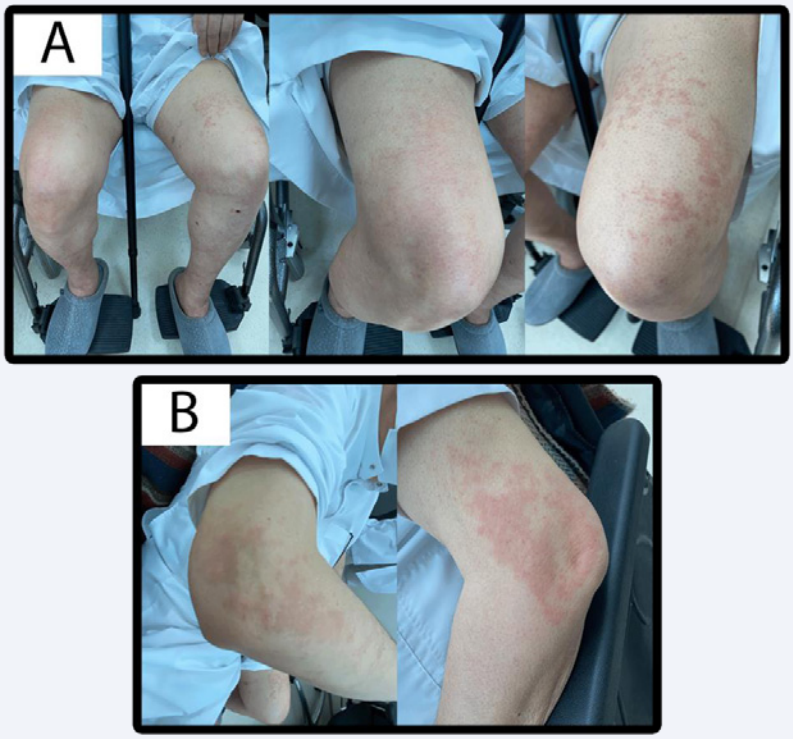

Figure 2 A punch biopsy specimen of front leg. Skin demonstrated epidermal spongiosis with dermal edema, and superficial and deep perivascular and interstitial lymphohistiocytic and eosinophilic cell infiltrate (Hematoxylin & Eosin 40x and 200x).

or by combining 2 types of oral antihistamines. Although there was a noticeable improvement of his symptoms after receiving the short course of oral corticosteroid, the same pruritic maculopapular rash had ascended from the distal parts of his extremities to involve the proximal parts, sparing the trunk and the face. To our knowledge, this ascending of the rash is a unique finding that was not reported elsewhere in similar circumstances, for which we have no clear explanation. More interestingly, our patient had a relatively longer time to reach full recovery despite receiving oral corticosteroid, compared to the data from the registry-based study in which patients responded well to topical steroids, oral antihistamines and/or analgesics with 3-4 days as a median time of response [5]. The dose of 20mg oral corticosteroids for one week was prescribed to avoid that the immunosuppression of the medication may disturb the effectiveness of the vaccine [6]. After completing the short course of corticosteroids following the 2nd dose, approximately 1-month duration was needed for his symptoms to resolve. Other than the treatment process, the delay can be explained by his old age, aging is characterized by a progressive reduction in homeostatic mechanisms, and therefore, a longer time is required for healing [7]. Likewise, transient cutaneous manifestations following Pfizer vaccine have been reported in a single-center case series from Italy with lesions resolved spontaneously within 2-3 days [8].

Few other cases have been reported too. For instance, a 30 years old male developed mild pruritic morbilliform eruption over the trunk after 48 hours from the administration of the 1st dose of Pfizer vaccine as well as the 2nd dose of the vaccine. Immune-mediated etiology was suggested in that vaccine-related rash due to the recurrence of the event and the more extensive rash upon recurrence [9]. The delayed response time after the 1st dose, the histological findings of lymphocytic dermatitis with no detection of antibodies and the appearance of the erythematous eruptions are suggesting type IV hypersensitivity reaction in our patient.

As future recommendations that we can draw from our case, when developing such allergic reactions, we would advise to postpone the 2nd dose administration until resolving of the symptoms. Moreover, we would emphasize to try more potent treatment modalities; systemic corticosteroids, in a low-dose and for short duration in order to avoid the potential of decreasing the efficacy of the vaccine itself. Testing for possible sensitizations to vaccine composites prior to receiving the vaccine would also be suggested. If existed, we would recommend administering corticosteroids as a prophylactic medication prior to receiving the 1st dose of the vaccine and its subsequent booster doses. Otherwise, to choose for alternative options of the vaccinations, such as Oxford/AstraZeneca or Moderna COVID-19 vaccines.

"Take-away" lessons

- Reporting unusual cases and tracking clinical experiences with this new technology in vaccination that is not yet fully studied will help in identifying similar adverse reactions in different populations or other conditions.
- It is very important in assessing the newly developed vaccine in order to adjust the current guidelines whenever needed and ensure best clinical practice.
- It will enhance the awareness of similar adverse events, especially with considering receiving booster doses of the vaccine in the future, for both health care practitioners as well as the public.

ACKNOWLEDGEMENTS

We would like to express our great appreciation to the patient and his family for their generous cooperation to make this report. We appreciate their motivation to share the case in order to inform health care practitioners as well as the public and contribute to overcome vaccination challenges of this pandemic.

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