Received: 14 March 2021 | Accepted: 20 May 2021
DOI: 10.1111/dth.15000

DERMATOLOGIC THERAPY WILEY

LETTER

Local reactions to the second dose of the BNT162 COVID-19 vaccine

Dear Editor,

Multiple strategies have been implemented worldwide to fight the burden of the pandemic caused by COVID-19, with vaccination being one of the most promising.[1]

Notably, the first vaccine to be authorized in Italy was the BNT162 mRNA-based vaccine, which has also been approved in the USA, United Kingdom, and Canada.[1,2] As a matter of fact, RNA vaccines are immunogenic and cost-effective.[1]

A 64-year-old woman presented to our department because of a cutaneous lesion on the site where the second dose of the Pfizer/BioNTech vaccine was administered 24 h before. The lesion (Figure 1A) consisted in a nodule surrounded by an erythematous halo which was extremely pruritic and painful. Compellingly, the signs persisted for 4 days before disappearing. However, pain and pruritus where still present at follow-up after a week from vaccination.

A 56-year-old woman presented with a round erythematous area on the skin on the same site in which she was administered the second dose of the BNT162 vaccine. The manifestation consisted in small vesicular lesions surrounded by erythema (Figure 1B) which had appeared 1 day after the injection. Like the previous instance, pain and pruritus were hallmarks of the condition and persisted even after the disappearance of the cutaneous lesion (a week later).

A 60-year-old woman presented severe xerosis and pruritus in the area in which she was injected the BNT162 vaccine. Furthermore, her chest was characterized by extensive erythematous pruritic and painful rash which paralleled the manifestation on the shoulder in onset and duration (Figure 1C). Both started 1 week after the administration and were still present at follow-up 7 days later.

None of our patients had a history of allergic reactions to vaccines or medications and the administration of the first dose of the vaccine had not been followed by any adverse event. None of the patients had a history of other dermatologic diseases nor were they being treated with chronic drugs.

The three patients were given a topical corticosteroid cream to alleviate the cutaneous manifestations (in patient 1 it was applied under plastic wrap occlusion).

Vaccine-related adverse reactions are not rare, with the not immunologically mediated ones being the most prevalent.[3] However, serious anaphylactic events are uncommon.[3]

The incidence of severe adverse allergic reactions following the administration of the first dose of the BNT162 vaccine seems to be infrequent.[4] In the USA, of almost 2 million people who received the first dose of the vaccine at the end of December 2020, only 0.001% developed anaphylaxis.[4] Compellingly, the majority of the subjects

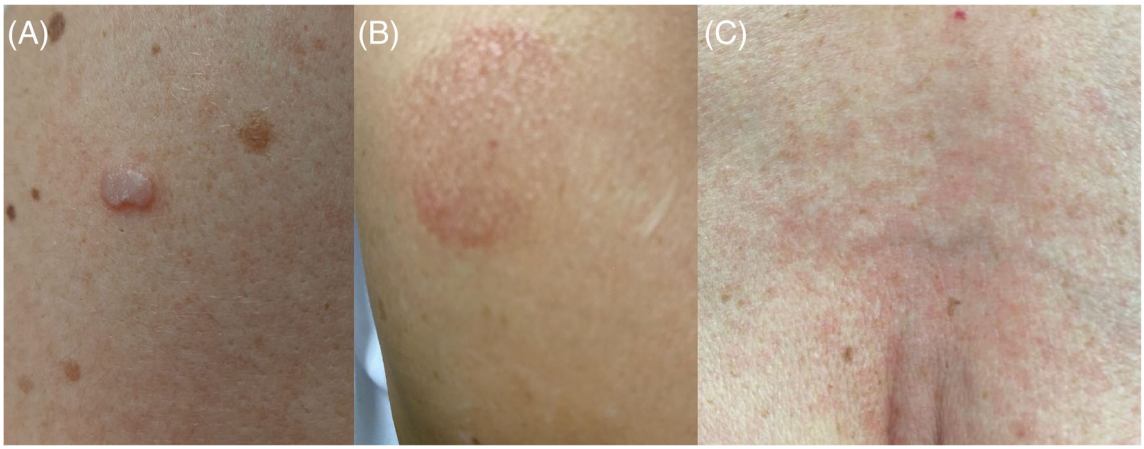

FIGURE 1 Adverse cutaneous reactions in three women after the second dose of the BNT162 vaccine. (A) A 64-year-old female patient presented a round indented nodule on the site of injection which was hard on palpation. The nodule was surrounded by erythema, painful, and pruritic. (B) Erythematous lesion characterized by multiple vesicles in a 56-year-old woman. The lesion was pruritic and painful. (C) Painful erythematous rash on the chest of a 60-year-old woman who also experienced pruritus on the same area

involved were women.[4] However, the data concerning the adverse events following the administration second dose are still limited.

Delayed adverse reactions to drugs and vaccines can appear hours and even after 2/3 weeks after administration.[4,5] Interestingly, according to recent evidence, large local delayed reactions caused by lymphocytes seem to be associated long-lasting immunity.[4]

Literature evidence highlights how polyethylene glycol (PEG), which is contained in the excipient ALC-0159 of the BNT162 vaccine, may be a potential culprit since it is a known high-risk allergen that can induce hypersensitivity reactions.[6,7]

Notably, another mRNA vaccine against SARS-CoV-2 has been reported to caused delayed local reactions.[8] However, local cutaneous reactions are not contraindications to vaccination.[9]

ACKNOWLEDGMENTS

The patients in this manuscript have given written informed consent to publication of their case details.

CONFLICT OF INTEREST

The authors declare no conflict of interest.

AUTHOR CONTRIBUTIONS

Antonella Tammaro: This author is the primary physician of the patient and supervisor of the process. The author created the idea, reviewed the manuscript, photography, data collection and follow-up. **Ganiyat Adenike Ralitsa Adebanjo, Francesca Romana Parisella**: The author took part in diagnosis, patient care and follow-up. The author took part in literature review, writing and preparation of the manuscript. The author reviewed the manuscript, photography and literature review. **Sergio Ramirez-Estrada**: The author took part in diagnosis, patient care and follow-up. The author took part in literature review, writing and preparation of the manuscript. The author reviewed the manuscript, photography and literature review. **Gabriella De Marco, Jordi Rello**: This author is the primary physician of the patient and supervisor of the process. The author created the idea, reviewed the manuscript, photography, data collection and follow-up.

DATA AVAILABILITY STATEMENT

Data sharing not applicable to this article as no datasets were generated or analysed during the current study.

Antonella Tammaro[1]
Ganiyat Adenike Ralitsa Adebanjo[1]
Francesca Romana Parisella[2]
Gabriella De Marco[1]
Jordi Rello[3,4,5]

[1]*Department of NESMOS Dermatology, Sapienza University of Rome, Rome, Italy*
[2]*Department of Medicine, University of Queensland, Brisbane, Australia*
[3]*Centro de Investigación Biomedica en Red de Enfermedades Respirorias (CIBERES), Instituto Salud Carlos III, Madrid, Spain*
[4]*Clinical Research/Epidemiology in Pneumonia and Sepsis (CRIPS), Vall d'Hebron Institut of Research (VHIR), Barcelona, Spain*
[5]*Clinical Research, CHU Nîmes, Université Montpellier-Nimes, Nîmes, France*

Correspondence
Antonella Tammaro, Department of NESMOS Dermatology, Sapienza University of Rome, Via di Grottarossa 1035/1039, 00189, Rome, Italy.
Email: tammaroantonella@gmail.com

ORCID

Antonella Tammaro https://orcid.org/0000-0002-4230-100X
Ganiyat Adenike Ralitsa Adebanjo https://orcid.org/0000-0001-8850-3072

REFERENCES

1. Chilamakuri R, Agarwal S. COVID-19: characteristics and therapeutics. *Cells*. 2021;10(2):206. https://doi.org/10.3390/cells10020206.
2. Autorizzato il vaccino BioNTech/Pfizer. https://aifa.gov.it/-/autorizzato-il-vaccino-biontech-pfizer
3. McNeil MM, DeStefano F. Vaccine-associated hypersensitivity. *J Allergy Clin Immunol*. 2018;141(2):463-472. https://doi.org/10.1016/j.jaci.2017.12.971.
4. Allergic reactions including anaphylaxis after receipt of the first dose of Pfizer-BioNTech COVID-19 vaccine, United States, December 14–23, 2020. *Morb Mortal Wkly Rep*. 2021;70(2):46-51. https://doi.org/10.15585/mmwr.mm7002e1.
5. Dies L, Sernicola A, Magri F, et al. A severe adverse reaction to omalizumab therapy in chronic spontaneous urticaria. *Dermatol Ther*. 2020;33(1):e13204. https://doi.org/10.1111/dth.13204.
6. Cabanillas B, Akdis C, Novak N. Allergic reactions to the first COVID-19 vaccine: a potential role of polyethylene glycol? *Allergy*. 2020. https://doi.org/10.1111/all.14711.
7. Sellaturay P, Nasser S, Ewan P. Polyethylene glycol-induced systemic allergic reactions (anaphylaxis). *J Allergy Clin Immunol Pract*. 2021;9(2):670-675. https://doi.org/10.1016/j.jaip.2020.09.029.
8. Blumenthal KG, Freeman EE, Saff RR, et al. Delayed large local reactions to mRNA-1273 vaccine against SARS-CoV-2. *N Engl J Med*. 2021;384(13):1273–1277. https://doi.org/10.1056/NEJMc2102131.
9. Kelso JM, Greenhawt MJ, Li JT, et al. Adverse reactions to vaccines practice parameter 2012 update. *J Allergy Clin Immunol*. 2012;130(1):25-43. https://doi.org/10.1016/j.jaci.2012.04.003.