

## LETTERS TO THE EDITOR

# Cutaneous reactions following booster dose of COVID-19 mRNA vaccination: What we should know?

Dear Editor,

From the diffusion of COVID-19 pandemics, several strategies were adopted to contain the spreading of the infection.<sup>1</sup> Among these, vaccination is the main weapon to overcome the pandemic. To date, 2 mRNA vaccines [Comirnaty® (Pfizer/BioNTech; BNT162b2) and Spikevax® (Moderna; mRNA-1273)] and 2 viral vector-based vaccines [Vaxzevria® (AstraZeneca; AZD1222) and COVID-19 vaccine Janssen® (Johnson & Johnson; Ad26.COV2. S)] have been authorized in Italy.<sup>2</sup>

Doses of COVID-19 vaccines following the primary series are described as booster doses.<sup>3</sup> Their intent is to restore protection that may have decreased over time.<sup>3</sup> Booster dose vaccine can be homologous (same as the primary vaccine) and heterologous (different from the primary vaccine). Even if several cutaneous reactions have been reported following the first and the second dose of vaccination,<sup>2</sup> data on booster doses are scant.

Herein, we want to review current literature on cutaneous reactions following the booster dose of COVID-19 vaccination in order to highlight possible pathogenetic mechanisms and to identify “at-risk” patients.

Data on cutaneous reactions following booster dose for COVID-19 derive only from a multicenter study and from the American Academy of Dermatology/International League of Dermatologic Societies registry.<sup>4,5</sup> Avallone et al. reported their real-life multicenter experience on 13 patients who experienced cutaneous reactions following booster dose of COVID-19 vaccination.<sup>5</sup> In particular, 2 chilblain-like, 2 urticaria, 2 pityriasis rosea-like eruptions, 1 bullous pemphigoid, 1 herpes zoster, 1 maculo-papular rash, 1 eczematous drug eruption, 1 lichenoid drug eruption, 1 erythema multiforme-like, and 1 cutaneous vasculitis were described.<sup>5</sup> Homologous and heterologous doses were administered in 8 and 4 patients, respectively.<sup>5</sup> Thirty-six cutaneous reactions were collected in the American Academy of Dermatology/International League of Dermatologic Societies registry.<sup>5</sup> Of these, 26 cutaneous reactions developed exclusively after the third dose. Urticaria was the most common cutaneous reaction collected ( $n = 14$ ), followed by reactions at the injection site (redness: 13, swelling: 11, and pain: 11), local reaction ( $n = 9$ ); erythromelalgia ( $n = 3$ ); and vesicular reactions ( $n = 3$ ).<sup>5</sup>

A connection between pre-existing cellular response and reactivity may explain the cutaneous reactions following boosted dose since it represents an additional trigger to the reactivity.<sup>6</sup> Heterologous booster seems to be more reactogenic than homologous, due to the higher and different mRNA dosage.<sup>6</sup> Moreover,

this difference may explain why some patients developed cutaneous reaction only after the third dose of vaccination.

Currently, the pathogenetic mechanisms of cutaneous reactions following COVID-19 vaccination are unknown. However, our analysis showed that cutaneous reactions are rarely serious. Moreover, they do not contraindicate future vaccination and may develop exclusively after the booster dose, mainly if heterologous. Certainly, more studies are needed, particularly on cutaneous reactions and booster doses, in order to understand the pathogenetic mechanism and reduce the vaccine hesitancy. Surely, vaccination should not be discouraged. Finally, clinicians should keep in mind that cutaneous reaction may occur after booster dose, even when reactions to the first and second doses did not occur.

## AUTHOR CONTRIBUTIONS

**Potestio Luca** and **Martora Fabrizio** involved in data curation, formal analysis, investigation, visualization, writing—original draft preparation, and writing—review and editing. **Villani Alessia** contributed to the conceptualization, validation, visualization, writing—original draft preparation, and writing—review and editing. **Fabrocini Gabriella** contributed to the conceptualization, validation, visualization, writing—review and editing, and supervision.

## KEYWORDS

booster dose, COVID-19, vaccination

## DATA AVAILABILITY STATEMENT

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

Luca Potestio MD 

Alessia Villani MD 

Gabriella Fabrocini MD 

Fabrizio Martora MD 

*Section of Dermatology - Department of Clinical Medicine and Surgery, University of Naples Federico II, Napoli, Italy*

## Correspondence

Luca Potestio, Section of Dermatology - Department of Clinical Medicine and Surgery, University of Naples Federico II, Via Pansini 5, 80131 Napoli, Italy.

Email: [potestioluca@gmail.com](mailto:potestioluca@gmail.com)

**ORCID**

Luca Potestio  <https://orcid.org/0000-0001-5940-0592>

Alessia Villani  <https://orcid.org/0000-0001-6430-268X>

Gabriella Fabbrocini  <https://orcid.org/0000-0002-0064-1874>

Fabrizio Martora  <https://orcid.org/0000-0003-2523-050X>

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