

**CASE REPORT****A Case Report of Papulo-pustular Rosacea-Like Reaction after the Second Dose of Pfizer Vaccine***Hayder R Al-Hamamy\*, Zainab K Jawad\*\****ABSTRACT:**

Coronavirus disease-2019 (COVID-19) has affected countries around the world. The introduction of COVID-19 vaccines has proved the most effective weapon in the fight against the disease.

The massive vaccination campaign against COVID-19 pandemic started in 2020 lead to significant decrease in the number of symptomatic infected patients and a decline in the mortality related to COVID-19 infection. However, with the vaccination of billions of people, data on vaccine-induced adverse reactions are also emerging.

Here we report a 50 year old woman who manifested a papule-pustular rash within 24hours of receiving the second dose of pfizerBioNTech COVID19 vaccine. We report this case to raise awareness regarding various cutaneous manifestations associated with COVID-19 vaccination.

**INTRODUCTION:**

Billions of people worldwide have received coronavirus disease-2019 (COVID-19) vaccines, and the available data support the efficacy of the vaccines against the disease<sup>(1)</sup>.

On August 23, 2021, FDA announced the first approval of a COVID-19 vaccine. The vaccine has been known as the Pfizer-BioNTech COVID-19 Vaccine, and will now be marketed as "Comirnaty" for the prevention of COVID-19 in individuals 16 years of age and older<sup>(1)</sup>.

As more and more people receive vaccines, adverse events to vaccines are also being reported.

Here we report a patient who developed papulo-pustular rash following Pfizer COVID-19 vaccine.

**CASE REPORT:**

A previously healthy 50 year old woman presented to the dermatology department< Medical City Teaching Hospital? Baghdad, 4 days after receiving the second dose of PfizerBioNTech COVID19 vaccine, within 24 hours of her vaccination, she noted facial swelling and a skin rash localized on both cheeks associated with burning sensation. She is afebrile and reported no constitutional symptoms.

She has no history of dermatological diseases, allergies or recent infections. She did not use any topical medication before the appearance of the rash.

She had not been taking any medications except an antihypertensive for years and nebulized salbutamol along with occasional hydrocortisone injections only during exacerbation of allergic bronchitis (she has not been taking any systemic steroids for months).

Examination revealed well demarcated edematous, erythematous plaques and papules involving both cheeks reaching, but not crossing, the nasolabial folds with overlying numerous monomorphic pustules.

Vaccine associated papulopustular rosacea-like eruption was diagnosed.

She was prescribed sun protection cream and topical pimecrolimus 1% cream. She did not report for follow up.

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Figure 1: Front view of the patient with a pustular eruption on a background of erythema



Figure 2: Right and left side views of the patient with a pustular eruption on a background of erythema

**DISCUSSION:**

Pfizer-BioNTech COVID-19 Vaccine is authorized for emergency use and is available under the Emergency Use Authorization as a

two-dose primary series for individuals 5 years of age and older, as a third primary series dose for individuals 5 years of age and older who have

been determined to have certain kinds of immunocompromise, and as a single booster dose for individuals 12 years of age and older at least five months after completing a primary series of the vaccine<sup>(1)</sup>. Literature states that a non-serious reaction occurs in about 372 out of every million administered doses of the mRNA vaccines (Moderna and Pfizer-BioNTech vaccines), including injection site pain, fatigue, headache, muscle pain, fever, joint pain, chills, and nausea. The documented adverse events are more frequent after the second dose<sup>(2)</sup>. McMahon et al. documented 414 cutaneous reactions after Moderna and Pfizer COVID-19 vaccination, with 17% of them following Pfizer vaccine<sup>(3)</sup>. The reaction patterns included delayed large local reactions (most common), local injection site reactions, urticarial eruptions, morbilliform eruptions, pernio/chilblains, cosmetic filler reactions, herpes zoster, flares of herpes simplex, and pityriasis rosea-like reactions<sup>(3)</sup>. In their series, 21% of patients developed cutaneous reactions following the first dose of vaccine, 63% following the second dose, and 16% had reactions following both doses<sup>(3)</sup>.

Merrill et al. observed two men (50 and 80 years old, respectively) who developed facial pustular neutrophilic eruption within 24 hours of receiving the first and second doses of the mRNA-1273 SARS-CoV-2 vaccine, respectively. Both patients had facial swelling. Histopathology analysis showed neutrophil infiltration in the interstitium and within the intact follicular epithelium. The lesions responded to topical corticosteroid and topical tacrolimus, respectively. The patient who developed the rash after the first dose of the vaccine did not show any recurrence on receiving the second dose of the same<sup>(4)</sup>.

Cicarese et al. reported a 60 year old woman who developed a papulopustular rosacea-like eruption 4 days after the first dose of Vaxzevria (AstraZeneca) COVID-19 vaccine. The authors also noted a similar eruption 5 days after the second dose of Pfizer-BioNTech COVID-19 vaccine in another 47 year old woman. Both patients received only sun protection cream and attained a cure in 30 days and 20 days, respectively. The patient who developed the rash after the first dose of the AstraZeneca COVID-19 vaccine did not develop any adverse events following the second dose<sup>(5)</sup>.

Both Vaxzevria and Pfizer-BioNTech vaccines, through different mechanisms, induce the generation of neutralizing antibodies against

SARS-CoV-2 spike protein and specific T-cell expansion with cytokine secretion (IFN- $\gamma$ , IL-2 and IL-10)<sup>(6,7)</sup>. Such immune responses may play a role in the onset of rosacea-like eruptions, especially in patients with predisposing factors.

Indeed, the pathophysiology of rosacea is multifactorial, implicating a dysregulated innate and adaptive immune system and neurogenic dysregulation favoring excessive inflammation and vasodilation. In all types of rosacea, perivascular and pilosebaceous skin infiltrates show marked expression of innate immune cells, with the additional influx of macrophages and mast cells in papules and of neutrophils in pustules<sup>(8)</sup>.

A recent study showed higher IL-17 levels in the serum of rosacea patients than in healthy controls, suggesting a pathogenetic role of IL-17<sup>(9)</sup>.

Other mediators involved in rosacea vasodilatation and angiogenesis are as follows: nitric oxide, cathelicidins and VEGF, the main positive regulator of pathological angiogenesis. Elevated tissue VEGF expression has been found in rosacea, and VEGF receptors serum levels were higher in patients with rosacea than in controls<sup>(10)</sup>. It could be postulated that COVID-19 vaccination might trigger the secretion of cytokines and angiogenic factors causing the rosaceiform eruption<sup>(5)</sup>. Unfortunately extensive investigations could not be performed in our case. A similar reaction is expected following the 3rd vaccine dose, so discussing such a possibility with the patient and reassurance is mandatory. However, most cutaneous reactions that are associated with the mRNA SARS-CoV-2 vaccines are generally self-limited and minor and do not preclude vaccination<sup>(11,12)</sup>.

### CONCLUSION:

We report this case to improve awareness regarding the varying cutaneous manifestations associated with COVID-19 vaccination.

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