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Case report

Migratory dermatographic urticaria following COVID-19 vaccine booster in young adult male

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Abstract: With the recent approval of booster vaccinations in the United States for adults who already received their primary vaccinations, millions of adults have been administered the Pfizer-BioNTech or Moderna booster vaccines. Adverse events related to these vaccines continue to be reported and are majority self-limited. In this case report, we present a young male who acquired chronic, migratory dermatographic urticaria two weeks after administration of the Moderna mRNA-1273 COVID-19 vaccine booster.

Keywords: vaccine; hives; COVID-19; rash; allergy; urticaria; booster

1. Introduction

In response to the ongoing coronavirus disease-2019 (COVID-19) pandemic, the Food and Drug Administration (FDA) granted emergency use authorization of both the Moderna and Pfizer-BioNTech booster vaccines on November 19, 2021 [1]. These booster vaccinations were approved for individuals over the age of 18 who had already received their primary vaccinations. As of February 2nd, 2022, 88.47 million booster doses have been administered in the United States [2]. These vaccines are strongly efficacious at preventing symptomatic COVID-19 infection and are associated with few adverse events including local injection site reactions and the rarer events of myocarditis and pericarditis [3,4]. However, there is little research on the cutaneous reactions associated with the booster vaccines.

Some studies have found that delayed local reactions were the most common dermatologic

sequelae of the primary vaccine series [4,5]. However, few studies have examined the cutaneous reactions to the booster vaccines alone, and further there are few reported cases of delayed, chronic cutaneous reactions [6]. One case study reported a reaction similar to that which was observed in this study, with a young male who received the Pfizer-BioNTech booster vaccine and developed chronic, spontaneous urticaria. However, there are no reported cases of chronic, spontaneous cutaneous reactions following booster vaccination with the Moderna vaccine, as discussed in this case report.

This case report illustrates a delayed, chronic, and spontaneous cutaneous reaction to the Moderna mRNA-1273 COVID-19 booster vaccine. Despite treatment with corticosteroids and antihistamines, this patient continues to suffer with a chronic migratory cutaneous reaction with minimal relief of symptoms.

2. Materials and methods

2.1. Human ethics approval

This case report was not subject to IRB approval as there is a single patient described in this case report without the intent of testing a hypothesis via data analysis. Additionally, written informed consent was obtained from the patient with the understanding of patient confidentiality being retained at all costs to ensure anonymity.

3. Case presentation

A male in his mid-20s presented to the clinic two weeks after receiving his booster dose of Moderna mRNA-1273 COVID-19 vaccine for diffuse, spontaneous hives. The patient did not have any immediate reactions to the first dose, second dose, or booster except for mild headache and arm soreness.

The patient began experiencing mild urticaria on his face one week after his booster dose, for which he took one tablet of oral loratadine (Claritin) to manage symptoms. Eleven days post-booster, the patient began experiencing a diffuse, spontaneous rash around his neck, upper back, inner groin, hands, and feet along with maculopapular wheels on his right elbow. As shown in Figure 1, the rash continued to spread globally and lasted approximately 90 minutes in each location before migrating. The patient had no angioedema, wheezing, or shortness of breath. Dermatographia was noted on physical exam. The patient denied changes to diet and exposure to environmental or food allergens in the last six months. He had not been diagnosed with COVID-19 in the past. The patient was up to date with all vaccines and never had any anaphylactic or skin reactions to prior vaccines.

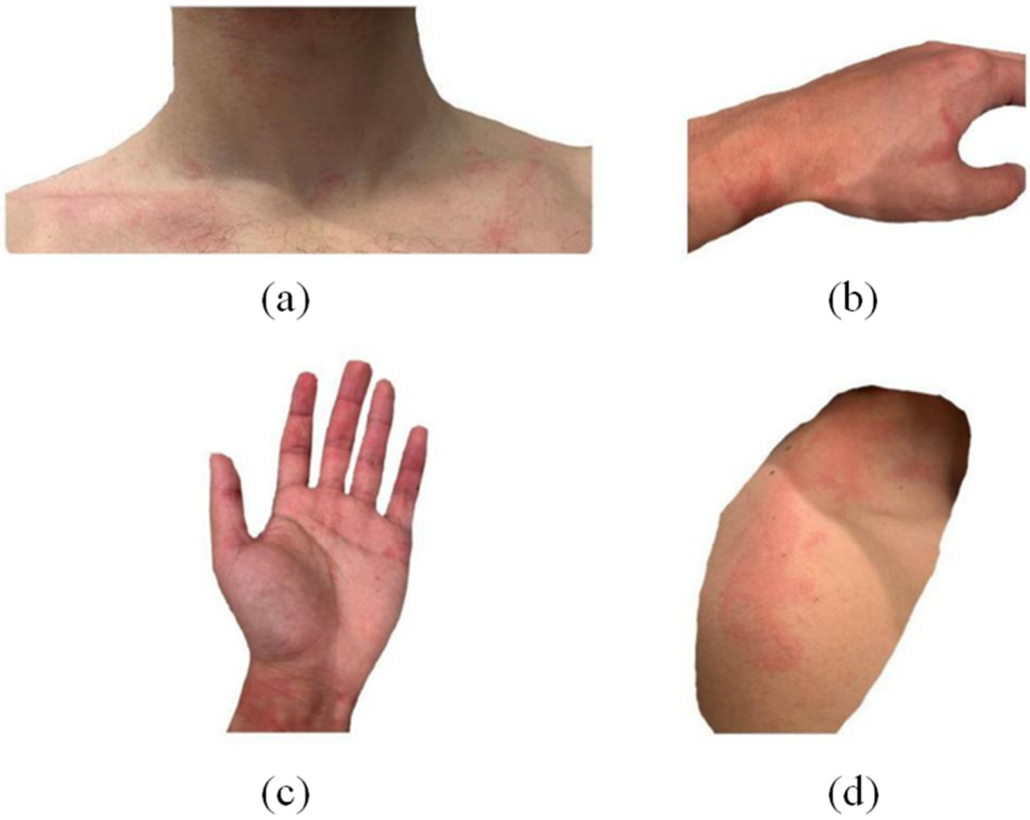

Figure 1. Global dermatographic urticaria. Global spontaneous urticaria on clavicles/neck (a), left wrist (b), left palm (c), and right deltoid (d) presenting and disappearing spontaneously after 90 minutes daily.

The patient had a history of spontaneous urticaria and family history of recurrent spontaneous urticaria. The patient described urticaria multiple times throughout childhood that were dermatographic in nature; patient stated that he would get hives after wearing baseball caps and would also see spontaneous hives after exercise. The patient stated that his mother has always had spontaneous hives on her back and abdomen periodically, which had always faded or had been treated with over-the-counter antihistamines. He had no chronic conditions and was not on any prescribed medications; he takes an over-the-counter B-12 complex 12 mcg once daily, which he began approximately six months prior to the onset of symptoms. Patient noted a history of seasonal allergies (dust mites, pollen), severe allergy to penicillin since childhood (causes diffuse hives), and severe anaphylactic reactions to sesame, flax, and chia seeds, all of which are avoided in diet.

Patient was given IM triamcinolone (Kenalog) 40 mg which alleviated the majority of the rash and urticaria in two hours. The next day, the patient stated that the rash began diffusely once again. The patient was then prescribed oral methylprednisolone 4 mg taper for six days and began taking one tablet of fexofenadine (Allegra) in the morning. After the sixth day of the steroid dose pack, the patient continued to have the migratory rash.

Complete blood count with differential was unremarkable (WBC 6.0 × 10^3/uL, eosinophils 3%). Absolute eosinophil count was within normal range (0.2 × 10^3/uL). Serum IgG was within normal range (803 mg/dL). Comprehensive metabolic panel and routine urinalysis were unremarkable. TSH

was within normal range (1.030 uIU/mL). ESR was within normal range (2 mm/hr). ANA-IFA was negative. The patient was advised to begin oral cetirizine (Zyrtec) 10 mg two tablets in the morning and two at night, which significantly decreased global eruptions; however, as cetirizine (Zyrtec) dose began to cease, spontaneous urticaria would continue to occur.

4. Discussion

Localized cutaneous reactions that occur immediately following COVID-19 vaccination have led to vaccine hesitancy. This immediate reaction is rarely associated with anaphylaxis, and therefore it is suggested that local cutaneous reactions should not discourage subsequent vaccine administration [5]. The patient discussed in this case study had no immediate or delayed cutaneous reaction to either the first or second Moderna injections.

Delayed local cutaneous reactions are the most common reaction to the COVID-19 vaccinations, and to date have been reported as self-limiting [3–5]. However, one study, by Johnston et al, reported that delayed cutaneous reactions following vaccination lasted 21 days on average [7]. The patient discussed in the case study by Thomas et al reported over eight weeks of chronic spontaneous urticaria since vaccination, and like the patient in our case report, currently has cutaneous symptoms daily despite Zyrtec administration [6]. Thorough medical history along with comprehensive physical exam and laboratory studies indicate that the rash is spontaneous, dermatographic urticaria in origin.

5. Conclusions

In this case report we discuss a young male patient with migratory dermatographic urticaria following the booster dose of Moderna mRNA-1273 COVID-19 vaccine. Similar to immediate cutaneous hypersensitivity reactions associated with COVID-19 vaccination, long term cutaneous reactions have not been found to be associated with anaphylaxis or other signs of emergent allergic reactions. As found with the patient discussed in this case, there were no other associated symptoms other than the cutaneous reaction. Therefore, this information should not be a deterrent to getting the vaccine booster. However, more research needs to be done to understand the pathophysiology and medical management of chronic, migratory dermatographic urticaria following COVID-19 booster vaccine.

Conflict of interest

The authors declare no conflict of interest.

Author contributions

RM: conception, design, interpretation of case presentations, writing of manuscript, revision of study material, final approval of manuscript; KS: writing of manuscript, revision of study material, final approval of manuscript; AV: served as scientific advisor and provided care for study patient, attending physician.

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