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Short Communication

Cutaneous Drug Eruption after COVID-19 Vaccination

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The SARS-CoV-2 virus is a highly transmissible virus that has infected millions of people globally over the past year. In the United States alone, over 400,000 deaths have been reported due to COVID-19 infection [1]. In order to prevent further spread and severe infection, the Food and Drug Administration (FDA) has authorized emergency use of the Moderna COVID-19 vaccine which has demonstrated an efficacy rate of 94.1% in preventing COVID-19 infection [2]. The current recommended administration schedule for the Moderna COVID-19 vaccine is a total of 2 doses, each given at an interval of 28 days apart. Despite its efficacy, adverse events and hypersensitivity reactions are still under evaluation with a few cases reported to date [3]. We report a case of a 40-year-old woman who exhibited a diffuse cutaneous eruption after receiving their first dose of the Moderna vaccine.

A 40-year-old female presented to the dermatology office on 1/18/21 for a severely pruritic and diffusely painful “rash” which had been worsening over the past 12 days. History revealed that she received the Moderna COVID-19 vaccine administered by injection to her left lateral arm on 1/6/21. Hours after vaccination, she felt soreness and experienced an erythematous patch on the inner portion of her left arm, medial to the injection site. Over the next few days, the eruption spread more diffusely on her body and persisted. The patient was seen by her primary care physician on 1/11/21 who gave her an intramuscular corticosteroid injection, and she was prescribed topical hydrocortisone along with a methylprednisolone dose pack for symptomatic relief. She had no change in her symptoms so a second intramuscular corticosteroid injection was given on 1/17/21. The patient was tested for COVID-19 several

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times throughout the past year and received negative results most recently the day prior to her dermatology office visit. She denied any systemic symptoms, such as fevers, chills, cough, diarrhea, taste or smell. Past medical history included anxiety disorder which was treated with oral alprazolam and oral sertraline. There had been no recent medication changes or dosage adjustments. On presentation, she exhibited pruritic erythematous papules, coalescing into plaques, symmetrically involving the upper and lower extremities and trunk bilaterally (Fig. 1). A diagnosis of drug reaction was suspected and punch biopsy was performed. The biopsy site was a plaque on her left anterior proximal thigh. The patient was prescribed triamcinolone acetonide 0.1% cream to apply twice daily for two weeks, cetirizine 10 mg orally twice daily, and hydroxyzine 10 mg orally at night as needed for symptomatic relief. She was scheduled for follow up in 2 weeks for suture removal and re-evaluation. Upon follow up, her cutaneous eruption has cleared and she denied any further symptoms or adverse reactions to the vaccine. She was advised not to take the second vaccine injection and is in communication with the Centers for Disease Control to discuss alternative vaccination methods.

Histopathology of the biopsy sample demonstrated a moderately dense inflammatory infiltrate within the dermis, primarily in a perivascular distribution. The infiltrate consisted mainly of lymphocytes and eosinophils with occasional histiocytes (Fig. 2). The histopathologic differential diagnosis included papular urticaria or drug eruption.

The Moderna vaccine is an intramuscular injection used in attempt to prevent COVID-19 infection in adults. It is composed of synthetic messenger Ribonucleic Acid (mRNA) encoding pre-fusion stabilized spike glycoprotein of SARS-CoV-2 virus, lipids, tromethamine, tromethamine hydrochloride, acetic acid, sodium acetate and sucrose. Vaccination for COVID-19 is relatively new and, thus, there are few reports in the literature explaining adverse reactions from the Moderna vaccine in the general public. Other mRNA vaccines have been reported to cause mild to moderate reactogenicity symptoms such as localized injection site pain or systemic common-cold-like symptoms. Rarely, Bell's palsy has been reported [4,5]. In a phase 3 clinical trial with over 30,000 participants, 84.2% of patients had solicited adverse events at the injection site after dose 1 of the Moderna vaccine. After the second dose, 88.6% experienced these adverse reactions. Most commonly, symptoms include erythema, induration, and pain at the injection site. Other common solicited adverse events included fatigue, headache, muscle or joint pain, and chills. Lymphadenopathy of the axilla on the arm of the injection site has also been reported. Hypersensitivity reactions such as injection site urticaria or a maculopapular rash were experienced by 1.5% of participants. There were no reports of vaccine related anaphylaxis. All of the reactions were more common in those under 65 years of age [2]. Another study reviewed cutaneous manifestations after COVID-19 vaccination with either the Moderna vaccine or the Pfizer vaccine. Compared to the Pfizer vaccine, the Moderna vaccine demonstrated a higher incidence of cutaneous eruptions, many of which look similar to the cutaneous signs of COVID-19 infection [6]. Both the vaccines and viral infection can

cause a wide array of dermatologic manifestations such as morbilliform exanthem, urticaria, exaggerated herpes zoster, pernio, and pityriasis-rosea like exanthems [6,7]. This overlap in dermatologic signs of vaccination reaction and COVID-19 infection presents a new challenge for dermatologists to distinguish the cause. However, thorough history and review of symptoms can help distinguish a dermatologic sign of COVID-19 infection from a vaccination reaction. Timeline may be a useful tool as well since COVID-19 infection cutaneous reactions often emerge up to 2 weeks after infection symptoms begin, unlike that of a vaccination reaction [8]. Moreover, histopathology and lab work might be helpful in determining the cause particularly in the case of our patient who had histopathology consistent with that of a drug eruption. Our patient did not receive a total IgE or blood eosinophil count which may have also facilitated finding the etiology of this cutaneous eruption.

Our patient experienced a cutaneous drug eruption that began the day of her COVID-19 vaccination and persisted. When a dermatologist encounters a patient with clinical and pathological findings consistent with drug eruption, they will question the patient about medications they are taking regularly or have used recently to hopefully identify the culprit drug. However, this case highlights that COVID-19 vaccination may cause a cutaneous hypersensitivity eruption that simulates a drug reaction, underscoring the need for a thorough history including recent vaccination. This is important to identify as an adverse event of the COVID-19 vaccination so that patients are not taken off medications which are mistakenly thought to be the causative agent. By understanding that this adverse event is associated with COVID-19 vaccination, dermatologists can provide better patient outcomes and avoid misconceptions about potential culprit medications.

Figure 1: Diffuse generalized red, pruritic maculopapular rash.

Figure 2: H and E (4x and 20x) showing a mixed perivascular infiltrate with eosinophils consistent with drug hypersensitivity.

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