Brief communication: A 61-year-old woman with vesicular eruption after varicella zoster vaccination

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ABSTRACT

Background: *Vesicular rashes are associated with a variety of infectious and noninfectious causes.*

Objective: *To discuss the differential diagnoses of vesicular rashes.*

Methods: *We present the clinical case of an adult woman who was immunocompetent and who developed several clear fluid-filled vesicles on her upper extremity within days of receiving the varicella zoster vaccine. Over the next several days, the skin eruption generalized, and she developed new lesions in various stages of healing.*

Results: *After a detailed history and further studies were obtained, a final diagnosis was made.*

Conclusion: *In patients who have recently been vaccinated, a high index of suspicion for an adverse vaccine reaction should be maintained.*

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CHIEF CONCERN

The patient was a previously healthy 61-year-old woman who was immunocompetent and who presented to clinic with several clear fluid-filled vesicles localized to the upper extremity 6 days after receiving the live-attenuated varicella zoster virus (VZV) vaccine.

HISTORY OF PRESENT ILLNESS

The initial history had been obtained by the inpatient team. The patient had been otherwise well since receiving the vaccine. She did not have any associated symptoms and had no known sick contacts or recent travel. A single lesion was unroofed at that time and a sample was obtained for polymerase chain reaction (PCR) testing for VZV and herpes simplex virus (HSV). The provider recommended that she keep the area covered and cleared her for vacation travel to the southwestern United States. Over the next several days, she developed increasing pruritus, while the area of skin involvement progressed to include all four extremities as well as her trunk. She had no systemic symptoms. She then presented to the emergency department for further evaluation due to progression of the rash. The patient reported a personal history of depression, hyperlipidemia, and allergic rhinitis that were well controlled. She was not taking any new medications, herbals, or supplements in the past month. She had taken fluoxetine, simvastatin, aspirin, and loratadine for many years without any adverse reaction. She specifically indicated that she was not taking any systemic corticosteroids or other immune suppressive agents, and she had no history of opportunistic or recurrent infections.

PHYSICAL EXAMINATION

On examination, vital signs were within normal limits. The patient appeared uncomfortable but nontoxic. She was noted to have multiple clear, fluid-filled vesicles on an erythematous base in a linearly streaked distribution on her dorsal forearms bilaterally and on the anterior surface of her right lower leg. Raised erythematous plaques were also observed on her right upper back. There were multiple areas of skin erosion and excoriations associated with each of these areas without overt signs of secondary bacterial skin infection (Figs. 1 and 2). The results of the remainder of her examination were unremarkable.

LABORATORY AND OTHER DIAGNOSTIC FINDINGS

The initial viral PCR study was still pending at the time of presentation to the emergency department. Results of a complete blood cell count revealed a normal white blood cell count of $5.4 \times 10^3/\mu L$ cells and a normal differential (55% neutrophils, 30% lymphocytes, 6% monocytes, 8% eosinophils, 1% basophil). The C-reactive protein level was within normal limits at 0.190 mg/dL (reference range, 0–0.5 mg/dL). Results of a comprehensive metabolic panel were within normal limits. Blood and urine cultures were obtained.

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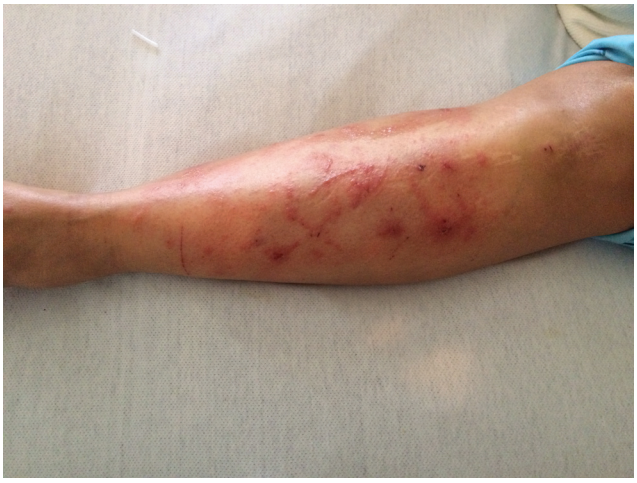

Figure 1. *Erythematous eruption along anterior leg with vesicles in a linear streaking pattern.*

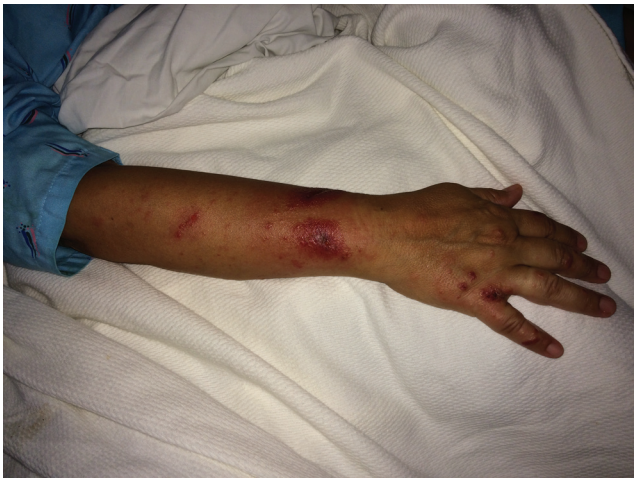

Figure 2. *Fluid filled vesicles on anterior arm in various stages of healing.*

Samples from the new skin lesions were obtained for viral cultures, Tzanck smear, and repeated PCR for HSV and VZV. Dermatology was consulted, and a skin biopsy was performed.

CLINICAL COURSE

The patient was admitted and empirically treated with intravenous acyclovir (20 mg/kg) every 8 hours until disseminated varicella could be ruled out. Her pruritus was managed symptomatically with scheduled cetirizine and intermittent doses of hydroxyzine.

QUESTIONS

What Is the Differential Diagnosis?

A differential diagnosis included: (A) varicella-like rash secondary to the varicella zoster vaccine, (B) disseminated HSV infection, (C) disseminated VZV infection, (D) rhus dermatitis, (E) papular urticaria, (F) irritant contact dermatitis, and (G) bullous pemphigoid.

What Diagnostic Studies Should be Performed?

A thorough history should be taken specifically regarding any new contacts or exposures, the evolution of symptoms after exposure, and the pattern of the cutaneous findings. In addition, the patient should be asked about any associated symptoms and history of opportunistic infections to help determine if there is increased risk of disseminated HSV or VZV. A Tzanck smear, VZV/HSV culture of the lesion should be obtained and antigen testing with VZV/HSV PCR should also be performed. A complete blood cell count with differential, T- and B-cell subsets, lymphocyte mitogens, and human immunodeficiency virus should be considered if the history and clinical course are concerning for an underlying immunodeficiency.[1]

DISCUSSION

Although this case illustrates one of the more commonly encountered forms of vesicular eruptions, multiple etiologies should be considered initially. History and physical examination findings should guide the diagnostic workup. Skin conditions to consider that produce a vesicular eruption would include disseminated HSV and VZV infections, bullous pemphigoid, papular urticaria, and rhus dermatitis. However, characteristic physical findings can clarify the ultimate etiology. Disseminated HSV infections will produce clusters of vesicles on an erythematous base that may be disseminated on the skin of patients who are debilitated or immunocompromised. However, such an extensive infection would be less likely in a patient who is otherwise healthy and vigorous. Bullous pemphigoid is common for older patients in whom multiple vesicles and bullae are limited to the extremities; however, onset is typically gradual. This is opposed to the acute presentation of papular urticaria secondary to arthropod assault, which will cause itchy vesiculation, often clustered on the extremities, in an area of exposure.[2]

In the context of recent VZV immunization, an adverse vaccine reaction should also be considered. The Shingles Prevention Study showed that, in the 42-day postvaccination period, 38 of 38,456 patients developed a noninjection site varicella-like rash after receiving the varicella-zoster vaccine.[3] In healthy recipients, rashes were mild, appearing as grouped vesicles on an erythematous base that presented in various stages of healing.[4] Fewer than 50 lesions manifested at the site of injection and typically appeared 14–28 days after vaccination.[5] However, this range varied anytime from 5 days to 6 weeks.[6] In these adult patients who presented with a varicella-like rash after vaccination, the latent

wild-type VZV (P-Oka), not the vaccine strain (vOka), was most commonly isolated.[7]

An adverse reaction to neomycin, a component of the VZV vaccine, should also be considered. An allergic contact dermatitis can be elicited by topical neomycin application, and hypersensitivity reactions have also been reported with other routes of administration. A contact dermatitis secondary to neomycin will usually present as a follicular eruption.[8] Although a history of contact dermatitis to neomycin is not a contraindication to the VZV vaccine, in the context of an acute onset of rash after receiving the VZV vaccine, inclusion of a dermatitis secondary to this component should still be considered as part of the differential diagnosis.[9]

This case illustrated how further history taking clarified the definitive diagnosis, and the importance of obtaining a detailed, time-specific history. In our case, a history later obtained when an allergy/immunology specialist had been consulted, revealed that the patient had been hiking in a forested area 3 days after receiving the vaccine. At that time, she noted intense itching along her forearms and hands before the onset of rash. Due to the characteristic linear pattern of the vesicular lesions, together with this new history and negative HSV/VZV results on Tzanck smear, PCR, and culture, it was ultimately concluded that the patient's clinical course was consistent with an allergic contact dermatitis, most likely due to poison ivy exposure. Contact with urushiol, the resinous sap contained in parts of the plant, will cause an intense vesiculation where streaked along the skin. A clustered, linear vesiculation, a few days after exposure is typical for this condition.[10]

Treatment for rhus dermatitis can be treated initially with topical glucocorticoid preparations. Although, in severe cases, systemic glucocorticoids may be indicated. She was prescribed 60 mg initially, tapering by 10-mg intervals[10] over a 2-week period of time. In our case, the patient's symptoms resolved with prednisone treatment, whereas empiric acyclovir had been stopped due to the definitive diagnosis.

FINAL DIAGNOSIS

Based on the morphology of the eruption in the context of her history, the results of the skin biopsy, and negative viral testing, the patient was ultimately diagnosed with rhus dermatitis.

CONCLUSION

We report a case of rhus dermatitis that was initially suspicious for an adverse reaction secondary to varicella zoster vaccination. An adverse reaction to vaccination, especially if occurring within a 42-day postvaccination window, should be considered in the differential of a patient with acute vesicular lesions. However, maintaining an initial broad differential to obtain an accurate history, clinic and laboratory features are of great importance to ultimately define the correct etiology. Determining the appropriate cause will then accurately direct treatment for the patient's symptoms.

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