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A rare case of herpes zoster triggered by a non-live varicella vaccine

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Abstract

Herpes zoster is caused by reactivation of the latent varicella zoster virus and often occurs in immunocompromised individuals. We describe a rare case of an immunocompetent patient with herpes zoster triggered by Shingrix, a non-live vaccine designed to protect against herpes zoster. Although herpes zoster has been described as a reaction to vaccinations before, to our knowledge this is the first report of herpes zoster triggered by a varicella zoster vaccine.

Keywords: general dermatology, herpes zoster, immunology, vaccine

Introduction

Herpes zoster (HZ) occurs in one million people each year in the United States and one in three people will have herpes zoster in their lifetime [1]. Herpes zoster occurs due to reactivation of the varicella zoster virus, but triggers for reactivation are infrequently established [2]. This case details HZ that was triggered following vaccination with Shingrix, a non-live vaccine designed to prevent HZ.

Case Synopsis

A 77-year-old woman with no significant past medical history presented to clinic for evaluation of a rash. The rash occurred one day after receiving her first dose of the Shingrix vaccine in her left arm. On examination, she had a pruritic vesicular rash with an erythematous base spanning an area of 8cm×5cm on her right chest in the T1-T2 dermatomal area (**Figure 1**). Further testing with varicella zoster polymerase chain reaction was positive, confirming a diagnosis of HZ. She was promptly treated with valacyclovir in addition to triamcinolone and silver sulfadiazine creams.

Additional history from the patient was pertinent for prior vaccination with the live attenuated HZ vaccine, Zostavax, 6 years prior. She tolerated this vaccine without noteworthy side effects. She had no history of immunosuppression and had not had HZ in the past.

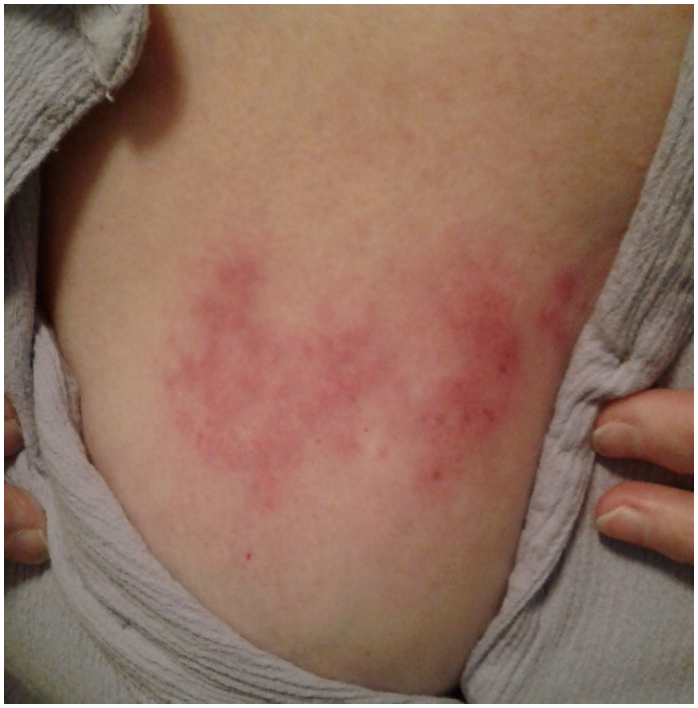

Figure 1. *Vesicular and papular rash overlying an erythematous base on the right chest.*

Case Discussion

Over 90% of the United States population has latent varicella virus and therefore can get HZ. However, HZ typically occurs in older patients due to declining cell-mediated immunity and in those who are immunocompromised, such as patients on immunosuppressive therapy or those with human immunodeficiency virus (HIV), diabetes, or cancer [1,2]. Sometimes HZ may be triggered by stressors such as fever, trauma, illness, or vaccination [3]. Vaccines previously reported as triggers for HZ include inactivated vaccines for influenza, hepatitis A, Japanese encephalitis, rabies, and COVID-19 [3].

Several vaccines exist to prevent the manifestations of varicella zoster. These include Varivax (a live-attenuated vaccine to prevent chicken pox in people without varicella antibodies), Zostavax (a live-attenuated vaccine to prevent HZ), and Shingrix (a recombinant, non-live vaccine to prevent HZ), [1,2]. Zostavax was the recommended vaccine for immunocompetent adults >60 years old until the approval of Shingrix in 2017 [1]. Now, Shingrix is generally the recommended vaccine for HZ prevention [2]. Side effects include injection site reactions and systemic effects including fever, fatigue, myalgias, and gastrointestinal symptoms [3]. Even with vaccination, older vaccinated adults can still develop HZ due to decreasing vaccine effectiveness over time and declining cell-mediated immunity, as in this case [1].

There are many types of modern vaccines, but the general goal of vaccines is similar and based on the body's immune response. When encountering a pathogen, the body's innate immune system is activated first and is heavily involved in the inflammatory response [4]. The antigen-specific adaptive immune response is later activated to directly fight the pathogen [5]. The adaptive response is influenced by the innate immune response and a weak innate response may lead to an ineffective adaptive response [5]. The goal of vaccines is to elicit an effective adaptive response leading to immunologic memory. They achieve this by activating the innate and adaptive immunity [5]. Many live-attenuated vaccines naturally activate the innate immune system, but other vaccines including subunit vaccines require an adjuvant to trigger the innate immune response [5]. This is true of the Shingrix vaccine, which contains the varicella glycoprotein E to elicit an adaptive response and an adjuvant to trigger the innate immunity [6]. Although this patient's development of HZ could have been a coincidence, we propose that our patient developed HZ during the innate response to vaccination and prior to successful activation of the adaptive immunity since illness, injury, and stressors may trigger HZ.

Conclusion

Herpes zoster commonly occurs in immunocompromised patients and may occur in immunocompetent patients following stressors [3]. Although uncommon, this case of HZ triggered by a non-live vaccine against HZ demonstrates important immunologic principles and underscores the importance of remembering diseases in the differential diagnosis even for vaccinated individuals.

Potential conflicts of interest

The authors declare no conflicts of interest.

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