

MORNING REPORT

Zostavax: Does it work every shingle time?

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A 65-year-old Caucasian male presents to clinic with a painful rash on the left side of his forehead. Three weeks prior to presentation, he received the Zostavax vaccine. Five days prior to presentation, he noticed intense tingling and pruritis on the left side of his forehead, followed by eruption of the rash. He also noticed redness in his left eye but denied any visual changes. The patient denies any sick contacts, recent travel, or skin exposure to any new agents. He denies any previous history of rashes. The patient has a history of type II diabetes mellitus (diet-controlled), chronic hepatitis C (without cirrhosis, and not on antiviral therapy), and major depressive disorder (not on anti-depressants).

The patient is afebrile with stable vital signs. His rash is characterized by grouped vesicles overlying an erythematous base over the left side of his forehead and nasal bridge (distribution in the V1 dermatome). The patient exhibits conjunctival injection in the left eye. The patient has no neurological or visual deficits. His labs are unremarkable.

Infection with the varicella-zoster virus (VZV) causes two distinct diseases. Primary infection with the varicella-zoster virus results in chickenpox; the virus then lays dormant in the dorsal root ganglia. Reactivation of this virus causes the clinical manifestation known as herpes zoster (HZ) or shingles. Diagnosis of HZ is primarily based on history and classic physical findings—specifically, the painful vesicular rash limited to a single dermatome. Herpes simplex virus (HSV) infection may mimic HZ and should be suspected in a patient with a recurrent zosteri-

form rash. Differentiating between HSV and VZV infection requires PCR testing of the lesion.

Given the patient's classic rash limited to the V1 dermatome, he is diagnosed with HZ. The vesicular lesion is swabbed and sent for PCR testing. Given the ocular symptoms, there is concern for herpes zoster ophthalmicus. The patient is evaluated by the ophthalmologist and is diagnosed with blepharoconjunctivitis secondary to HZ. The patient is given a 10-day course of acyclovir.

HZ carries a risk of post-herpetic neuralgia, super-imposed bacterial skin infection, and ocular involvement. Herpes zoster ophthalmicus occurs when reactivation of the VZV involves the ophthalmic division (V1) of the trigeminal nerve. Herpes zoster ophthalmicus can involve any ocular structure depending on the nerve branch involved. Blepharoconjunctivitis is a superficial infection involving the eyelid and conjunctiva. Patients with herpes zoster ophthalmicus are treated with oral antiviral agents for seven to ten days. Studies report alleviation of pain and decreased incidence of post-herpetic neuralgia with anti-viral treatment, especially if initiated within the first 72 hours.

After six weeks, the patient is seen in our clinic for a follow-up visit. The vesicular rash has healed with minimal scarring. His left eye is without conjunctival injection. He does not report persistent neuralgia. His PCR results are positive for VZV, confirming the diagnosis of HZ. Given the temporal relationship between the episode of shingles and Zostavax administration, the patient has several questions for the physician.

“Doc, did the vaccine give me shingles?”

In addition to demonstrating the efficacy of Zostavax, the Shingles Prevention Study (SPS) and Zostavax Efficacy and Safety Trial (ZEST) studied the side effect profile of Zostavax. Between the two studies, more than 30,000 subjects received Zostavax. In the six-week post-vaccination period, eight of these subjects developed PCR-confirmed HZ. Wild-type VZV was detected in all eight subjects, while the Oka/Merck strain VZV was not detected in any subject.^{1,2} Since these clinical trials have not found an incidence of HZ secondary to Oka/Merck strain VZV, it is safe to presume our patient developed HZ secondary to wild-type VZV. The temporal relationship between the vaccination and illness was purely coincidental.

“Why didn't the vaccine protect me from the virus?”

Several studies have demonstrated an age-related decline in VZV-specific T-cell mediated immunity (VZV-CMI), which is believed to be the immunological basis for the age-related increase in incidence of HZ.³ Zostavax has been shown to boost VZV-CMI, and this is thought to be the mechanism of its conferred protection. The SPS included an immunology sub-study in which subjects were tested for VZV-specific markers of immunity prior to vaccination (baseline), six weeks post-vaccination, and annually for three years. The study retrospectively compared the VZV-specific immune response in subjects who developed HZ to those who did not. The subjects who developed HZ

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had lower baseline and post-vaccination VZV-CMI.⁴ Therefore, the patients who develop shingles after vaccination are likely unable to mount an adequate T-cell mediated immune response to vaccination.

“So why didn’t my body respond to the vaccine?”

Advanced age and untreated depression are potential causes of inadequate post-vaccination VZV-specific immune response. The SPS immunology sub-study confirmed previous studies demonstrating an age-related decline in VZV-CMI.³ In addition, this study showed an age-related VZV-CMI decline in response to vaccination.⁴ The SPS depression sub-study found that patients with untreated depression also had diminished VZV-CMI response to Zostavax when compared to patients with

treated depression and patients without depression.⁵

Besides advanced age and depression, there may be other clinical comorbidities that affect immune response to Zostavax. Patients with these comorbidities may benefit from booster vaccinations or higher potency vaccinations. Further research is needed to identify these comorbidities and to design more personalized vaccination strategies for specific patient populations.

References

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