Introduction

Vaccines serve as cornerstone for disease prevention in the primary care setting. This potential benefit is even more apparent in certain high-risk population such as immunosuppressed patients or potential transplant patients who will be committed to life-long immune altering medications. Primary care physicians are confronted with the risk/benefit of administering live vaccines in these susceptible populations.[1] This paper specifically dissects a case involving an end-stage liver disease (ESLD) patient who developed disseminated cutaneous varicella-zoster virus (VZV) within 30 days of vaccination.

Case Report

A 66-year-old Caucasian male with ESLD secondary to alcoholic cirrhosis was admitted for an elective transjugular intrahepatic portosystemic shunt procedure. During his transplant evaluation 2 months earlier, the patient’s HIV, Hepatitis A, B, and C serologies were negative. His VZV IgG level at 3135 (>165 index value) was consistent with past infection. There was no history of diabetes mellitus or renal dysfunction, and the patient was not using immunosuppressive medications. The Zostavax vaccine (live, attenuated Oka/Merck VZV strain) was administered approximately 1 month before this admission.

After the procedure, the patient developed a pruritic rash on his back without prodromal features. The rash featured vesicular lesions over an erythematous base that was confined to the T1 dermatome and did not cross midline. Over the course of 5 days, the rash spread to his head and neck. Subsequently, it spread to his entire body, sparing the mucosal surfaces.

A direct fluorescent VZV antibody stain taken from a vesicle was positive. Treatment was initiated with intravenous Acyclovir 10 mg/kg every 8 h for disseminated cutaneous VZV infection. A 7 day course was completed, and the patient’s lesions resolved.

Discussion

VZV infection has a bimodal age distribution. The first outbreak usually occurs between 1 and 9 years of age, leading to active varicella (chickenpox) infection. The virus lays dormant within the dorsal root ganglia and reactivates to produce dermatomal VZV infection. In 6%–30% of immunocompromised patients, the reactivated virus can cause disseminated cutaneous VZV infection, defined by the presence of more than 20 vesicular

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lesions that do not follow dermatomal patterns, and crosses the midline boundary. This cutaneous outbreak can lead to life-threatening, multi-organ involvement including encephalitis, meningitis, pneumonitis, or myocarditis.

ESLD is known to cause cirrhosis-associated immune deficiency. Liver dysfunction leads to diminished synthetic production of complement proteins, pattern-recognition receptors, and acute phase reactants. This impaired response to pathogens is combined with a paradoxical, chronic systemic inflammatory state due to immune cell upregulation of cytokine production (specifically tumor necrosis factor-α), and surface activation markers.

The recent Zostavax administration in context of the cutaneous eruption is interesting. The patient's titers were consistent with past infection and should have conferred some protection. A study of over 14,000 patients who were taking immunosuppressive medications and who received the vaccine showed no link to disseminated VZV outbreak. However, several reports describe disseminated VZV related to the Oka VZV strain. The outbreaks usually occur within 42 days of vaccination. Our patient's vaccination was within 30 days of his outbreak.

It is difficult to ascertain whether the outbreak was due to the vaccine or reactivation of native virus, but the timing of events certainly raises that clinical question. The alteration in cell-mediated immunity in ESLD may explain the underlying pathophysiology and give healthcare providers pause when interpreting prevaccination titers. This leads us to the timing of live vaccinations in the pretransplant workup and potential risk associated with vaccination. Fortunately, a new recombinant subunit vaccine has successfully completed a phase three trial and may be an important alternative to live VZV vaccination.

To the best of our knowledge, there are no reports of disseminated cutaneous VZV infection in ESLD.

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Conflicts of interest
There are no conflicts of interest.

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