

Herpes zoster eruption associated with vaccine-strain varicella-zoster virus: A case report

Although rare, the development of shingles can be a late-onset consequence of receiving varicella-zoster virus vaccine.

ABSTRACT: Recipients of varicella-zoster virus vaccine for the prevention of chickenpox can suffer rare complications, including the development of vaccine-related zoster (shingles). Overall, the vaccine is effective in preventing chickenpox, but the medical community should be aware that vaccination can lead to the occurrence of shingles in the same way that natural infection with wild-type varicella-zoster virus can.

The routine administration of varicella-zoster virus (VZV) vaccine has been associated with a considerable reduction in chickenpox-related morbidity. Considering the vast number of vaccine doses administered in both community and tertiary care, short-term side effects of vaccination are relatively uncommon. Late-onset adverse reactions such as zoster (shingles) are even more uncommon. In 2013, one such late complication was seen in BC in the form of vaccine-related herpes zosteriform dermatitis.

Case data

A 9-year-old boy presented to a medical clinic in Kelowna in the summer of 2013. Aside from a rash of 1 day's duration and a stinging-quality pain of the posterior left thorax and left upper arm, the child was well constitutionally. History taking revealed he had been born 3 weeks premature, had experienced recurrent otitis media in his early years, and had received VZV vaccine before entering kindergarten. Otherwise, his medical history was unremarkable.

Upon examination, the child was found to have a zosteriform radicular pattern of skin eruption corresponding to dermatomes C6, C7, and C8. The eruption was patchy, flat, nonblistering, and eczematous. There was some tenderness on palpation of the region.

The child was febrile and did not have other foci of skin affliction. Nonetheless, a skin specimen was obtained for diagnostic studies, and oral acyclovir was prescribed. Thereafter, the child was reported to have developed only a few tiny vesicles. His pain abated by day 3, and the lesions healed fully over the next 3 weeks. The child's mother was pregnant, but had a history of chickenpox and did not develop infection over the following 8 weeks. There was no family history of immune dysfunction. There was no secondary spread of disease to two unvaccinated younger siblings.

Subsequently, VZV was detected in the skin specimen by the polymerase chain reaction assay. A strain-specific differentiation performed at the Public Health Agency of Canada's National Microbiology Laboratory identified the VZV as the vaccine strain of the virus.

Dr Cimolai is a professor in the department of Pathology and Laboratory Medicine at the University of British Columbia and a member of the medical staff at BC Children's Hospital and BC Women's Hospital and Health Centre. Dr Krajden is associate medical director of the BC Centre for Disease Control and a professor in the Department of Pathology and Laboratory Medicine at UBC. Dr Petric is a clinical virologist at the BCCDC and an emeritus professor in the Department of Pathology and Laboratory Medicine, UBC.

This article has been peer reviewed.

Discussion

Most common side effects of routine VZV vaccination include a localized eruption at the injection site or a mild, diffuse chickenpox-like eruption. Late or serious consequences of immunization are very rare.

The development of shingles among VZV vaccine recipients has been reported but is uncommon. Early estimates propose a frequency of 0.18 cases per 1000 vaccine patient years.¹ A subsequent study concluded that children who receive the vaccine are at a 4 to 12 times lower risk of suffering from zoster than those children who are naturally infected by wild-type VZV.² A large American study found the incidence of zoster (from both vaccine-strain and wild-type VZV) to be approximately 48 cases per 100 000 person years in vaccinated children, and 230 cases per 100 000 person years in unvaccinated children (from wild-type only).³ Among the vaccinees in the latter study, not all zoster occurrences were shown to be caused by vaccine-strain VZV. Of the post-vaccination zosteriform eruptions, 50% or more (up to 85%) were associated with vaccine-strain VZV and the remainder with wild-type VZV.³⁻⁶ This suggests vaccinees may become infected with wild-type virus, perhaps with minimal clinical manifestations, which can thereafter lead to the development of zoster. Clinical characteristics of vaccine-related zoster among children are generally very similar to those of zoster from wild-type virus, with a few exceptions.³

More aggressive vaccine-associated illnesses have been reported anecdotally.⁷⁻¹¹ A report from the Hospital for Sick Children in Toronto describes recurrent vaccine-related zoster in an immunocompetent child. Other reports have associated VZV vaccine with central nervous system disease, including

meningitis and encephalitis, with or without zoster.⁷⁻¹⁰

Summary

The use of varicella-zoster virus vaccine for the prevention of chickenpox has considerably reduced morbidity from infection with wild-type VZV. Unfortunately, the development of vaccine-association complications is one of the costs of achieving such success.

Any adverse reactions to vaccination should be reported to public health. As well, vaccinated patients with subsequent zoster should be considered contagious.¹² Appropriate barrier precautions are warranted since the zoster may be caused by either vaccine-strain VZV or wild-type VZV. In cases where there is a history of VZV vaccination, the physician should document the presence of VZV by submitting samples in viral transport. Along with the sample, the requisition should note that vaccine-strain VZV may be involved. In all such cases, the BC Centre for Disease Control laboratory may be consulted.

Competing interests

None declared.

Acknowledgment

This article is dedicated to the late Dr Peter Middleton, who made considerable contributions to medical virology at the provincial, national, and international levels.

References

1. Feder HM Jr, Hoss D. Herpes zoster in otherwise healthy children. *Pediatr Infect Dis J* 2004;23:451-457.
2. Civen R, Chaves SS, Jumaan A, et al. The incidence and clinical characteristics of herpes zoster among children and adolescents after implementation of varicella vaccination. *Pediatr Infect Dis J* 2009; 28:954-959.
3. Weinmann S, Chun C, Schmid DS, et al. Incidence and clinical characteristics of

herpes zoster among children in the varicella vaccine era, 2005-2009. *J Infect Dis* 2013;11:1859-1868.

4. Goulleret N, Mauvisseau E, Essevez-Roulet M, et al. Safety profile of live varicella virus vaccine (Oka/Merck): Five-year results of the European Varicella Zoster Virus Identification Program (EU VZVIP). *Vaccine* 2010;28:5878-5882.
5. Chaves SS, Haber P, Walton K, et al. Safety of varicella vaccine after licensure in the United States: Experience from reports to the vaccine adverse event reporting system, 1995-2005. *J Infect Dis* 2008;197 (suppl 2):S170-177.
6. Galea SA, Sweet A, Beninger P, et al. The safety profile of varicella vaccine: A 10-year review. *J Infect Dis* 2008;197 (suppl 2):S165-169.
7. Pahud BA, Glaser CA, Dekker CL, et al. Varicella zoster disease of the central nervous system: Epidemiological, clinical, and laboratory features of 10 years after the introduction of the varicella vaccine. *J Infect Dis* 2011;203:316-323.
8. Han JY, Hanson DC, Way SS. Herpes zoster and meningitis due to reactivation of varicella vaccine virus in an immunocompetent child. *Pediatr Infect Dis J* 2011; 30:266-268.
9. Chouliaras G, Spoulou V, Quinlivan M, et al. Vaccine-associated herpes zoster ophthalmicus and encephalitis in an immunocompetent child. *Pediatrics* 2010;125: e969-972.
10. Levin MJ, DeBiasi RL, Bostik V, et al. Herpes zoster with skin lesions and meningitis caused by 2 different genotypes of the Oka varicella-zoster virus vaccine. *J Infect Dis* 2008;198:1444-1447.
11. Ota K, Kim V, Lavi S, et al. Vaccine-strain varicella zoster virus causing recurrent herpes zoster in an immunocompetent 2-year-old. *Pediatr Infect Dis J* 2008;27: 847-848.
12. Brunell PA, Agnew T. Chickenpox attributable to a vaccine virus contracted from a vaccinee with zoster. *Pediatrics* 2000; 106:E28. **BCMJ**