Oka-Strain Varicella-Zoster Virus Meningoencephalitis in a Healthy Adolescent: Case Report and Review of the Literature

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Background

Routine vaccination with varicella-zoster (VZV) vaccine has resulted in significant declines in the incidence of VZV cases, hospitalizations, and deaths across pediatric age. This vaccine is safe and effective and adverse events are monitored closely.

Case Description

A twelve-year-old healthy, fully-vaccinated boy presented to urgent care clinic with L frontotemporal headache, L-sided eye pain, and photosensitivity. Over several days, a leftsided facial rash progressed; papular and vesicular lesions developed over the cheek, as well as over the left side of the chin and at the midline of the lower lip. He was somnolent, sleeping 18- 20 hours a day. The child was evaluated by a pediatric neurologist who noted a left-sided ptosis and left lateral rectus palsy; he was admitted for further workup. Cerebrospinal fluid (CSF) analysis showed WBC of 33 cells/ml³ with 92% lymphocytes; glucose of 44mg/dL (serum glucose 84mg/dL), and protein of 50mg/dL (range: 15-45). Nasopharyngeal multiplex polymerase chain reaction (PCR) (BioFire Diagnostics, Salt Lake City, Utah) was positive for rhinovirus/ enterovirus. Testing of facial vesicles for varicella-zoster virus (VZV) and herpes simplex virus (HSV) was negative by DFA and culture, and enteroviral throat and rectal PCRs were negative. However, CSF PCR for VZV was found to be positive.

Case Description, cont'd.

In light of this finding, the viral isolate was sent to the Varicella Zoster Virus Identification Program at Columbia University, part of the Worldwide Adverse Experience System of Merck and Co Inc. Viral strain typing and single-nucleotide polymorphism analysis were performed as previously described (LaRussa, 1992). The isolate was determined to be Oka-strain VZV (vOka). The patient initially received 7 days of intravenous acyclovir, during which time his rash rapidly resolved and mental status returned to baseline. His parents were concerned for a persistent mild left-sided ptosis but this was not of significant concern to either the Ophthalmology or Pediatric Neurology services.

Conclusion

This case represents only the fifth reported case of vOka meningitis in a fullyvaccinated (2 doses received) and healthy child reported to date, and one of very few cases of vOka meningoencephalitis in immunocompetent adolescents. In most reports of vaccinated children with vOka meningits, the patient had only received one dose of VZV vaccine. While rare, vOka meningitis is an entity of which primary care pediatricians and infectious diseases specialists should be aware, even in older children.

Discussion and Review of the Literature

vOka can, in rare cases, cause pneumonia, hepatitis, meningo-encephalitis, herpes zoster (occasionally recurrent), and secondary transmission events (Sharrar, 2000)(Chaves, 2008). Central nervous system (CNS) complications infections due to VZV are rare in the setting of immunization, and CNS infection due to reactivation of vOka strain are rarely reported in the pediatric population. Viral typing has historically been unavailable in most reported cases of CNS VZV disease, and vaccine-strain cases have characteristically presented similarly to wild-type (WT) VZV cases, making it difficult to distinguish disease due reactivation of vaccine-strain virus from that caused by WT virus. Almost all prior reported cases occurred in children (Pahud, 2011)(Hsu, 2011), and most (n=5) were previously healthy. All reported cases recovered with antiviral therapy. Ongoing monitoring and viral sequencing in cases of breakthrough cases of VZV should be carried out to monitor trends in VZV meningitis in immunocompetent children.

Publication	Age, Sex, Health Status	# Vaccine Doses	Clinical Presentation	Treatment	Outcome
Nadimpalli, 2020	12yo healthy M	2	HA, fever, rash, MS changes	ACVx7d, VACVx7d	Full recovery
Ramachandran, 2020	14yo healthy F	2	HA, fever, rash	ACVx7d, VACVx14d	Full recovery
Harrington, 2019	14yo healthy M	2	HA, malaise, anorexia, rash	ACVx7d	Full recovery
	14yo M w HSCT 10mo prior to illness	2	HA, fever, rash	ACVx27d followed by indefinite ppx	Encephalopathy with recovery
Chen, 2017	14yo healthy F	2	HA, rash	ACVx7d, VACVx14d	Full recovery
Han, 2011	7yo healthy M	1	Fever, HA, photophobia, vomiting,	ACV x 21d	Full recovery
Pahud, 2011	12yo healthy F	1	Rash, meningitis, fever, transaminitis	ACV, duration unreported	Full recovery
Chouliaras, 2010	3yo healthy F	1	Rash, dizziness, somnolence	ACV, duration unreported	Full recovery
lyer, 2010	9yo healthy M	1	Rash, HA, meningismus	ACV x 10d	Full recovery
Levin, 2008	8yo healthy M	1	Rash, HA, meningismus	ACV x	Full recovery

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