

Varicella Zoster Virus Meningitis in a Previously Immunized Child

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ABSTRACT. We are reporting a previously well 5-year-old child with varicella-zoster meningitis who had a history of a previous immunization against varicella. This child also developed a transient sensorineural hearing loss. The child was treated with acyclovir and made a full recovery. *Pediatrics* 2004;114:e273–e274. URL: <http://www.pediatrics.org/cgi/content/full/114/2/e273>; *varicella, varicella vaccine, varicella meningitis, sensorineural hearing loss.*

ABBREVIATIONS. VZV, varicella-zoster virus; CSF, cerebrospinal fluid; PCR, polymerase chain reaction.

The vaccine to protect against varicella was approved by the Food and Drug Administration in 1995. Follow-up studies have verified the effectiveness of the vaccine, and children who were previously vaccinated and were infected with the wild virus had mild to moderate symptoms.¹ In a recent report of an outbreak of varicella in a child care center in New Hampshire among immunized children, there were no severe complications or hospitalizations of affected patients.²

We report the case of a previously immunized child who developed skin lesions consistent with varicella and aseptic meningitis. The child did well clinically but developed a transient sensorineural hearing deficit.

CASE REPORT

A previously healthy 5-year-old girl presented to the emergency department with a 5-day history of fever, headache, and rash. The rash began on the face and spread to the trunk. It was described as pruritic and painful, and the lesions were raised. The headache was diffuse, and it would wake her from sleep. She had not experienced vomiting or ataxia. She was started on penicillin a few days before presentation for presumed group A streptococcal pharyngitis, but the culture was subsequently negative and the penicillin was discontinued. There were no known sick contacts or exposures to varicella, and her immunizations were up to date. When she was 3 years of age, she had received the varicella-zoster virus (VZV) vaccine, 18 months before this illness.

On admission, her temperature was 40.3°C, pulse was 148/min, blood pressure was 109/80, and she was awake and responsive. There were vesicles on the soft palate, her neck was supple, and a positive Brudzinski and negative Kernig's sign were elicited. The skin had diffuse papules, vesicles, and scabbed lesions.

Her serum electrolytes, hemoglobin, and platelet count were normal. Her white blood cell count was 4500 cells/mm with 50% neutrophils, 26% lymphocytes, 12% monocytes, and 7% reactive

lymphocytes. Cerebrospinal fluid (CSF) revealed 715 white blood cells with 97% lymphocytes. There were 168 red blood cells/mm, the protein was 133 mg/dL, and the glucose was 46 mg/dL with concurrent serum glucose of 86 mg/dL. The Gram-stain was negative for bacteria. The child was started on acyclovir for presumed VZV meningitis and vancomycin and ceftriaxone for possible partially treated bacterial meningitis. The skin lesions were positive for VZV by direct immunofluorescence antibody, and the CSF was positive for VZV by polymerase chain reaction (PCR). The CSF PCR for herpes simplex virus types 1 and 2 was negative. Serum immunoglobulin and lymphocyte subsets were normal. She completed a 10-day course of acyclovir in the hospital.

The child made an uneventful recovery and was discharged from the hospital without medications. A follow-up hearing evaluation 6 weeks later demonstrated mild to moderate sensorineural hearing loss from 500 to 1000 Hz on the right side and normal hearing on the left. Tympanometric testing was normal. Two years later, her hearing was normal and she was doing well.

DISCUSSION

The American Academy of Pediatrics recommended the routine use of varicella vaccine in May 1995 after licensure of the vaccine in March 1995. Serious complications of varicella are rare, but before licensure of the vaccine, ~90 fatal cases per year had been reported to the Centers for Disease Control and Prevention in previously healthy individuals younger than 20 years.³ Although most instances of morbidity associated with varicella are unreported, secondary bacterial skin infections are common. Pneumonia, central nervous system disease, renal disease, and arthritis may also be seen. The incidence of varicella and the rate of hospitalizations as a result of severe varicella infections have declined since the vaccine was introduced.^{1,4}

Aseptic meningitis has been reported in the literature with active varicella. Johnson and Milbourn⁵ reported 4 cases of aseptic meningitis in the prevaccination era diagnosed clinically. All of the cases had pleocytosis of the CSF, and 2 had elevated protein. Two of the cases had active varicella lesions at the time of diagnosis, 1 had scabbed lesions, and the fourth had a varicella exposure and an associated convulsion. All of the patients recovered without sequelae. Koskiniemi et al⁶ reported 3231 patients with central nervous system symptoms and suspected viral cause. With PCR testing, a viral cause was demonstrated in 46% of the cases and VZV was confirmed in 29% of those.

Naruse et al⁷ reported a case of VZV meningitis in a previously immunized 45-month-old child. The child had been immunized 21 months before developing meningitis, and there was evidence of seroconversion by immune adherence agglutination 4 weeks after immunization. Two weeks before this illness, the child had been exposed to an individual with

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varicella. The child was febrile, vomited, and complained of a headache. He did not demonstrate any meningeal signs. He had the typical rash of varicella with 97 lesions, and the CSF cell count was 413 white blood cells/mm with 98% lymphocytes. The protein was 48 mg/dL, and the glucose was 50 mg/dL. Bacterial cultures were negative, and he received 3 days of acyclovir. The child made an uneventful recovery without complications. The CSF was positive for VZV by PCR. This was the first reported case of aseptic meningitis caused by VZV in a previously immunized patient with evidence of seroconversion. The illness was presumed to be secondary to a wild strain of VZV because of the recent exposure, and the lesions on the skin were not limited to a specific dermatome that would be expected if this were a reactivation of VZV, typical of herpes zoster.

Our patient also had a history of being immunized, although there was no laboratory evidence of seroconversion. She demonstrated a severe headache and had a positive Brudzinski sign. Her CSF demonstrated an elevated protein, an increased number of white blood cells with a predominance of lymphocytes, and a normal glucose. Although she had an uncomplicated course in the hospital, there was a transient sensorineural hearing deficit at follow-up, which eventually resolved. Hearing loss after VZV meningitis has not been previously reported.

Galil et al² demonstrated that the incidence of breakthrough varicella was twice the risk in children who are vaccinated >3 years before exposure. In contrast, our patient received her varicella vaccination 18 months before her infection. Verstraeten et al⁸ reported an increased risk of vaccine failure when varicella vaccine was given <28 days after the administration of the measles-mumps-rubella vaccine and in children younger than 15 months. The *Red-*

*book*⁹ states that in vaccinated individuals, the disease may be so mild that it is unrecognizable as varicella.

Although the literature has documented cases of varicella after immunization, most reports do not include cases with complications. Our patient and the patient from Japan show that there may be serious complications in previously immunized children.

In summary, although the incidence of varicella and complications has decreased since the licensure of the vaccine, there may be breakthrough cases of varicella with aseptic meningitis and transient sensorineural hearing loss.

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