Varicella-Vaccine Failure in an Outbreak in an Elementary School in Minnesota

To the Editor—Varicella-vaccine failure in a 6-year-old boy attending an elementary school in Minnesota was accompanied by illness for 3 days, ~40 lesions, and fever for 2 days. Presence of the boy at the school during all 3 days of illness resulted in acquired varicella in 32 students. Both unvaccinated and vaccinated students were afflicted. Previously vaccinated students—53% of the total number of cases—had fewer lesions and a sickness of shorter duration [1]. Surely, improved levels of varicella vaccination, including the administration of booster shots, would address similar episodes attributable to vaccine failures. Nonetheless, it would be prudent to explore the utility of prophylactic acyclovir administered to halt the spread of vaccine or wild-type virus in otherwise closed communities. Administration of oral acyclovir to healthy susceptible subjects at the beginning of secondary viremia in the late incubation period (up to 9 days after exposure) could effectively prevent or modify the clinical course of varicella disease.

At the Chang Gung Children’s Hospital in Taoyuan, Taiwan, 27 healthy infants and children susceptible to varicella received, for each of 5 days, starting 9 or 11 days after exposure to the index case in the family, an oral dose of acyclovir of 40 mg/kg of body weight, in 4 divided doses. Their clinical features were compared with those of 13 control children who did not receive acyclovir. Of the 27 children in the treatment group, 2 (7.4%) developed varicella. Of the 13 children in the control group, 10 (76.9%) developed the disease [2]. Furthermore, in Ogaki, Japan, a female infant was infected with varicella by her mother. Prophylactic intravenous acyclovir at a dose of 15 mg/kg of body weight was unsuccessful, and the infant developed varicella during the hospital stay. Nevertheless, nosocomial spread of varicella was prevented by administration of oral acyclovir to 6 preterm infants in contact with the infected infant. Administration of acyclovir in a daily oral dose of 40 mg/kg of body weight, in 4 divided doses, was not associated with any adverse effects. None of the 6 preterm infants developed varicella [3].

Recommendations to keep every varicella-infected child, irrespective of vaccination status [1], out of school might not always be appropriate. Any absence during a regular, grade-level, or competitive examination might be academically disastrous. Such directives might lead students with mild cases of varicella—that is, students such as the 47% of the Minnesota children with <50 lesions—to hide eruptive lesions and mild pyrexia. Prophylactic oral acyclovir [2, 3] administered, irrespective of any prior vaccination, to such schoolchildren would be judicious and might prevent unnecessary absence from school.

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acyclovir in a school setting include limited knowledge of date of exposure, potential compliance issues, and cost. Post-exposure prophylaxis data were obtained in household settings in which the likely date of exposure was known and the scope of transmission was limited [6–8]. In a school or child-care setting, the date of exposure is less definite and the scope of potential transmission may be extensive. Suga et al. reported that the timing of the administration of prophylactic oral acyclovir is critical; the clinical attack rate in those receiving prophylactic oral acyclovir during the first 7 days of the incubation period was 91%, compared with 27% in those receiving it during the second half of the incubation period [7]. These data suggest that the administration of oral acyclovir when the definite date of exposure is unknown could result in infection rates similar to those found in individuals who did not receive such prophylaxis.

In addition, antiviral prophylaxis in a school or child-care setting remains the responsibility of the individual child’s health care provider. Given the absence of clear national and professional guidelines on providers’ use of acyclovir, compliance with recommendations for mass prophylaxis is unlikely.

Finally, depending on the dosage, the cost of prophylactic acyclovir could be ~$20–$80 per individual. In our investigation, there were 307 students attending the school during the outbreak of varicella there [2], which would equate to a cost of $6140–$24,560 for prophylaxis of all students. Furthermore, the ready availability of adequate antiviral stock in a small community is unlikely.

Administration of the varicella vaccine is the current recommendation for the prevention of varicella illness; data have shown that the vaccine provides substantial protection against moderate and severe varicella symptoms. Clearly, post-exposure prophylaxis with acyclovir has a role in certain circumstances. From a public health perspective, however, the primary goal for varicella control remains prevention of disease—increasing the immunity of the population through vaccination and thereby reducing the probability of exposure and disease. And, unlike administration of acyclovir, prevention through vaccination is more likely to offer protection during future exposures as well.

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