Adverse effects of varicella vaccination are under-reported in VAERS, mitigating against discovery of the true-cost benefit

Gary S. Goldman, PhD
Medical Veritas International (MVI)
P.O. Box 847
Pearblossom, CA 93553
Phone: +1 661 944 5661 Fax: +1 661 944-4483

Abstract

Varicella vaccination is generally considered safe but there are usually no prescreening tests to determine whether an adverse reaction is likely to occur. The literature contains a surprising number of adverse reactions following varicella vaccination including vaccine-strain herpes-zoster (HZ) in children and adults. The Advisory Committee on Immunization Practices (ACIP) states, "VAERS data are limited by underreporting and unknown sensitivity of the reporting system, making it difficult to compare adverse event rates following vaccination reported to VAERS with those from complications following natural disease. Nevertheless, the magnitude of these differences makes it likely that serious adverse events following vaccination occur at a substantially lower rate than following natural disease." Since follow-up is not conducted, it may be argued that some reports may not be attributed to or associated with vaccination and therefore the true rate of adverse events is essentially unknown. Nevertheless, adverse reactions reported in VAERS have typically been shown to be only 5% or 10% of the true rates. Cost-benefit analyses of the universal varicella vaccination program appear to be optimistic, especially when adverse vaccine reactions are completely ignored or excluded.

Keywords: varicella vaccination, adverse vaccine reactions, VAERS, deleterious effects

1. Introduction

Varicella vaccination is generally considered safe [1] but there are usually no prescreening tests to determine whether an adverse reaction is likely to occur [2]. The literature contains a surprising number of adverse reactions following varicella vaccination [3-14] including vaccine-strain herpes-zoster (HZ) in children and adults [15,16]. The Advisory Committee on Immunization Practices (ACIP) states, "Vaccine Adverse Event Reporting System (VAERS) data are limited by underreporting and unknown sensitivity of the reporting system, making it difficult to compare adverse event rates following vaccination reported to VAERS with those from complications following natural disease. Nevertheless, the magnitude of these differences makes it likely that serious adverse events following vaccination occur at a substantially lower rate than following natural disease [17]." Since follow-up is not conducted, it may be argued that some reports may not be attributed to or associated with vaccination and therefore the true rate of adverse events is essentially unknown. Nevertheless, adverse reactions reported in VAERS have typically been shown to be only 5% or 10% of the true rates. The lot number associated with each vaccine is recorded in the VAERS data base. However, the CDC and FDA have never required the vaccine manufacturers to publicly divulge the number of vaccines contained in a given lot. This prevents researchers from determining "hot lots" since calculation of the number of adverse reactions per lot is not possible.

2. Consideration of varicella adverse reactions reported to VAERS

Table 1 presents a comparison of the number of adverse reactions reported to VAERS for the varicella vaccine with 4 other different vaccines. The high mean of 3,000 reports/year is attributed to the Hepatitis B vaccine, followed next by a mean of 2,350 reports/year attributed to varicella vaccine (Table 1). The first report of an adverse reaction following varicella vaccination was filed with VAERS (ID 74221) on May 26, 1995. This 3.5-year-old boy from Georgia who had no pre-existing conditions, received a dose of varicella vaccine on May 12, 1995. He developed convulsions the following day, was hospitalized, and reportedly recovered.

Table 1. VAERS reports associated with Varicella, DTaP, Hep B, Hib, and MMR vaccines through December, 2003

Vaccine type	Reports	Date of first report	Duration (years)	Mean cases/year
Varicella	20,004	12 May 1995	8.5	2,350
DTaP[a]	23,886	2 Apr 1992	11.4	2,080
Hep B[b]	41,708	25 Jan 1990	14	2,980
Hib[c]	25,060	2 Jan 1990	14	1,790
MMR	31,132	17 Nov 1989	14	2,220

[a]Diphtheria and teanus toxoid and acellular pertussis
[b]Hepatitis B
[c]Haemophilus *influenzae* type B
Source information from U.S. Government VAERS data base, 1990-2003, http://www.medalerts.org/vaersdb

Many physicians consider vaccination extremely safe and parents or patients are not provided with information regarding potential adverse outcomes. Since varicella disease is relatively benign, only a few serious adverse reactions might offset the intended benefits.

Wrensch et al. suggest a novel finding that adults who have *not* had prior varicella-zoster virus (VZV) infection (including onset of chickenpox) are more likely to have gliomas (brain tumors) than adults who have had prior infection [10]. The brain tumor pathogenesis is not fully understood at this time.

doi: 10.1588/medver.2005.02.00051

3. Selected clinical descriptions of serious adverse affects presumed to follow varicella vaccination

Clinical descriptions of five different serious adverse affects that followed varicella vaccination are given below.

Case "A"

A 35-year old female who had never had varicella, was exposed to infected children. Her physician recommended prompt vaccination and she received a first dose of varicella vaccine on May 18, 1998. Approximately two hours following vaccination, a transient welt developed at the injection site with a 3-inch line of lymphangitis. Eight days after vaccination, she developed a fever, sore throat, nausea, vomiting, malaise and dizziness. She noticed some bruises and had aching in her knees, hands and feet. She was seen by her physician because of an irregular heart rate and an ECG revealed supra ventricular extra systoles and left ventricular hypertrophy. Her CPK was elevated to 676. Her nausea and vomiting persisted for the next three months despite use of anti-nausea medication. She was admitted to a hospital for rehydration after losing 12 lbs or more than 10% of her previous healthy weight. The patient later developed a cough, marked fatigue, sensitivity to light and sound, disturbed sleep and more serious loss of appetite. These symptoms along with dizziness persisted for weeks and she had difficulty going from her bed to the bathroom without assistance. By the sixth month post-vaccination, she was seen by a neurologist and a physiatrist. Both thought that she could have Guillian-barre syndrome. An EMG revealed involvement in an ulnar distribution. The patient's nausea decreased and her fever subsided. Her joint pains became episodic but more intense during the attacks and she experienced some muscle weakness on and off. Gradually she was able to work for a few hours at a time. A VAERS report was filed January 30, 2000.

Case "B"

A man who was vaccinated against varicella in 1995 developed encephalomyloneuritis and required hospitalization for months. He remains permanently disabled.

Case "C"

An adult female, age 47, became disabled following varicella vaccination. She worked as a research coordinator in the infectious disease unit of a Medical School. She and other immune employees were recruited as healthy controls for a manufacturer-sponsored vaccine study aimed at detecting the boosting effect of the vaccine. Her pre-study laboratory values were completely normal. She received a first dose of the vaccine in March and the second in May 2001. She developed diarrhea shortly after the second dose and by November 2001, she was quite ill and had serious intestinal difficulties. She underwent a colonoscopy and was diagnosed with the rare and more serious collagenous colitis. While her lymphocytes decreased from 25 to 14%, her total white count, neutrophils and eosinophils increased. She was told that her collagenous colitis was autoimmune in nature. She remains disabled and out of work and the event has been reported to VAERS.

Case "D"

A 17-month-old female toddler received the varicella vaccination on March 20, 1996. Her older brother reacted to all vaccinations and developed late-onset autism following his MMR. D's mother was initially fearful and refused the varicella vaccine for her daughter. Her physician reassured her by saying: "Do you think I would give the vaccination to my own children if I thought it wasn't safe?" Her physician also informed her that state law mandates chickenpox vaccination but never told her that she could withhold her consent. The mother says that she felt "humiliated into allowing her daughter to receive the varicella vaccine." Shortly afterwards, "D" began having joint pains, eczema and allergies. Her symptoms worsened at the age of 6. Her ANA became positive and she developed autoimmune thyroid disease with a high TSH. Her skin sensitivity also became more intense. Her physician was of the opinion that a virus probably triggered her autoimmune response.

Case "E"

This boy was born on June 30, 1998 and received the varicella vaccination on June 29, 2000. Twenty-eight months following varicella vaccination (October 29, 2002), he developed breakthrough chickenpox with an estimated 30 to 40 lesions that were intensely itchy. He was listless and had some rhinorhea but remained afebrile.

On June 12, 2003 (age 5), he had a unilateral shingles eruption on the back of his neck. He had moderate pain and the lesions were tender and sensitive to clothing. In spite of treatment with Acyclovir* the rash lasted for 45 days.

Nine months later on March 10, 2004 he had a recurrence of shingles affecting the left nipple and the left side of the back. This time, the pain was more severe. He was treated again with Acyclovir. The rash slowly subsided but left scars.

Two months later on May 13, 2004 he had still another recurrence with moderate pain, in the same location as previously mentioned. He received a third course of Acyclovir and the rash resolved after a month.

Each of the three occurrences of the shingles rash was on his left side. He took Acyclovir Oral Suspension (200mg/5ml): Two teaspoons 4 times a day for 5 days.

4. Conclusion

In conclusion, cost-benefit analyses of varicella vaccination appear optimistic, but they fail to factor in the resulting deleterious effects. Analyses of the universal varicella vaccination program in the U.S. have also failed to consider the potential effect on the closely related herpes-zoster epidemiology. Exogenous exposures to wild type varicella have previously contributed a significant immunologic boosting effect that helps suppress the reactivation of herpes-zoster. In the U.S. where vaccination coverage is increasing, and since wild-type varicella has been dramatically reduced in many communities, immunologic boosting via periodic exposures to children with wild-type varicella is becoming rare, causing a need for a booster vaccination in children.

doi: 10.1588/medver.2005.02.00051

References with notes

[1] Braun MM, Mootrey GT, Seward JF, Rider LG, Krause PR. Postlicensure safety surveillance for varicella vaccine. JAMA, 2000; 284:1271–9.

[2] Poser CM. Neurological Complications of Vaccinations. Mealey's Litigation Report, Thimerosal & Vaccines. April, 2003; 1(10).

**** The author writes concerning neurological complications, "There is no way of predicting who will have an adverse reaction to vaccination. The individual's susceptibility is determined by the genetic background and previous immunological history. We are constantly exposed to a wide variety of viral antigens that cause our immune system to develop antibodies against them. The phenomenon of molecular mimicry explains why some people's immune system will mistakenly respond to the measles antigen, for instance, in the vaccine because some of its amino acid groupings, its epitopes, are the same as those in the protein of a previously encountered viral antigen."**

[3] Ravkina LI, Matsevich GR. Morphological changes in the central nervous system in post-vaccinal encephalomyelitis developing after chickenpox vaccination in children. Zh. Nevropatol. Psikhiatr. Im. S. S. Korsakova, 1970;70(10):1465–71.

[4] Sunaga Y, Hikima A, Ostuka T, Morikawa A. Acute cerebellar ataxia with abnormal MRI lesions after varicella vaccination. Pediatr. Neurol, 1995;13(4):340–2.

*** Two-year-old boy with staggering gait and difficulty speaking.**

[5] Singer S, Johnson CE, Mohr R, Holowecky C. Urticaria following varicella vaccine associated with gelatin allergy. Vaccine, 1999;17(4):327–9.

[6] Gerecitano J, Friedman-Kien A, Chazen GD. Allergic reaction to varicella vaccine. Ann. Intern. Med, 1997;126(10):833–4.

[7] Sakaguchi M, Yamanaka T, Ikeda K, Sano Y, Fujita H, Miura T, Inouye S. IgE-mediated systemic reactions to gelatin included in the varicella vaccine. J. Allergy Clin. Immonol, 1997;99(2):263–4.

[8] Naruse H, Miwata H, Ozaki T, Asano Y, Namazue J, Yamanishi K. Varicella infection complicated with meningitis after immunization. Acta. Paediatr. Jpn, 1993;35(4):345–7.

[9] Lee SY, Komp DM, Andiman W. Thrombocytopenic Purpura following varicella-zoster vaccination. Am. J. Pediatr. Hematol. Oncol, 1986;8(1):78–80.

[10] Wrensch M, Weinberg A, Wiencke J, Miike R, Barger G, Kelsey K. Prevalence of Antibodies to Four Herpesviruses among Adults with Glioma [Brain Tumor] and Controls. Am. J. Epidem, 2001;154(2):161–5.

*** Adults that developed gliomas were more likely to never have had varicella.**

[11] Naseri A, Good WV, Cunningham ET Jr. Herpes zoster virus sclerokeratitis and anterior uveitis in a child following varicella vaccination. Am. J. Ophthalmol, 2003;135(3):415–7.

[12] Esmaeli-Gutstein B, Winkelman JZ. Uveitis associated with varicella virus vaccine. Am. J. Ophthalmol, 1999; 127(6):733–4.

[13] Wirrell E, Hill MD, Jadavji T, Kirton A, Barlow K. Stroke after varicella vaccination. J Pediatr, 2004 Dec; 146(6):845–7.

*** Two children presented with acute hemiparesis 5 days and 3 weeks following varicella vaccination. Both showed unilateral infarction of the basal ganglia and internal capsule, a distribution consistent with varicella angiopathy. Both children had small patent foramen ovale (PFO), and one child also had severe iron-deficiency anemia, which may have predisposed the patient to this adverse effect.**

[14] Bronstein DE, Cotliar J, Votava-Smith JK, Powell MZ, Miller MJ, Cherry JD. Recurrent papular urticaria after varicella immunization in a 15-month-old girl. Pediatr Infect Dis J. 2005 Mar;24(3):269–70.

[15] Matsubara K, Nigami H, harigaya H, Baba K. Herpes zoster in a normal child after varicella vaccination. Acta. Paediatr. Jpn, 1995;37(5):648–50.

*** Authors report that a healthy 5-year-old girl developed HZ in the dermatome supplied by the ophthalmic branch of the fifth cranial nerve 40 months after varicella vaccination.**

[16] Hammerschlag MR, Gershon AA, Steinberg SP, Clarke L, Gelb LD. Herpes zoster in an adult recipient of live attenuated varicella vaccine. J. Infect. Dis, 1989;160(3):535–7.

[17] Centers for Disease Control and Prevention (CDC), Morbidity and Mortality Weekly Report (MMWR), Prevention of Varicella Updated Recommendations of the Advisory Committee on Immunization Practices (ACIP), May 28, 1999; 48(RR06):1–5.

doi: 10.1588/medver.2005.02.00051