

Incidence of Herpes Zoster in Pediatricians and Family Practitioners

— Estimation of Efficacy of Varicella Vaccine for Protection Against Herpes Zoster in the Elderly —

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ABSTRACT. To know whether the varicella vaccine can be used for protection against herpes zoster, we investigated the incidence of herpes zoster in pediatricians, who are thought to be boosted in specific cellular immunity by reexposure to varicella-zoster virus (VZV). We sent questionnaires to 500 pediatricians in their fifties and sixties in Japan concerning their past history of herpes zoster, their physical condition, reexposure to VZV and so on. Thirty-four of 344 pediatricians had a past history of herpes zoster. The incidence per 100,000 person-years of herpes zoster was 65.2 in those in their fifties and 158.2 in those in their sixties, which are 1/2 to 1/8 of other reports regarding a general population. We can speculate that varicella vaccine may protect against herpes zoster, because the varicella vaccine can enhance VZV-specific cellular immunity such as the immunity in pediatricians.

Key words: herpes zoster — pediatrician — varicella vaccine

The incidence of herpes zoster increases with aging, and control of postherpetic neuralgia is still a major problem in the elderly. Recently, basic studies of the use of live attenuated varicella vaccine for protection against herpes zoster in elderly subjects have been initiated, and the activation of specific cellular immunity after vaccination in these subjects has been demonstrated by the lymphoproliferative assay¹⁾ and the varicella skin antigen test.²⁾ However, we do not know whether activated specific cellular immunity can protect one against herpes zoster, because the vaccine has not been used against herpes zoster in elderly people for a long-term period.

VZV-specific antibody has been detected in almost all patients with herpes zoster, but VZV-specific cellular immunity has been depressed in those patients.³⁾ Therefore, on the basis of the lymphoproliferative assay, the mechanism of the viral reactivation is thought to involve a deficiency in VZV-specific cellular immunity. There have been reports that specific cellular immunity has been activated by reexposure to VZV; for example, in pediatricians who are subject to frequent reexposure to VZV when they see patients with chickenpox⁴⁾ and the adults of households reexposed to children with chickenpox.⁵⁾ To determine whether the booster effect from reexposure

can protect one against herpes zoster; that is, to get some clue as to whether the varicella vaccine can be used for protection against herpes zoster in the near future, we investigated the incidence of herpes zoster in pediatricians.

SUBJECTS AND METHODS

We sent questionnaires to 500 pediatricians and family practitioners in their fifties and sixties, who were enrolled as a pediatrician or a physician for internal medicine and pediatrics in a medical society of each district in Okayama and Hiroshima prefectures in Japan, concerning their past history of herpes zoster, their physical condition by a self-evaluation, whether they had examined patients with chickenpox or herpes zoster, and whether they had seen pediatric patients at the time they had herpes zoster.

RESULTS

Three hundred fifty-two questionnaires were sent back, but eight of these were omitted because they were incomplete. There were 107 subjects in their fifties, 216 in their sixties and, unexpectedly, 21 in their seventies, with a mean age of 60.3 years old. Thirty-four pediatricians among the subjects had a past history of herpes zoster. Two of these had a second form of herpes zoster and seven of them had developed herpes zoster before fifty years of age (Table 1). The incidence per 100,000 person-years of herpes zoster was 65.2 in those in their fifties and 158.2 in those in their sixties. Five of the seven who had herpes zoster in their fifties were in poor physical condition. Two of 7 subjects were thought to be reexposed to VZV through seeing patients with chickenpox or herpes zoster. The remaining two who were not in poor physical condition had not seen patients with chickenpox or herpes zoster. In their sixties, only 3 of 20 subjects were in poor physical condition, and 12 of 20 subjects had reexposure to VZV. However, 6 of the 17 who were not in poor physical condition had not had reexposure to VZV before the time they had herpes zoster.

TABLE 1. Incidence of herpes zoster in pediatricians and history of physical condition and of seeing patients with chickenpox or herpes zoster

Age (years)	Subject	History		
		Herpes zoster	Poor physical condition	Seeing patients with chickenpox or herpes zoster
50-59	107	7	5	2
60-69	216	20	3	12
70-79	21	0	-	-

DISCUSSION

The incidence of herpes zoster in pediatricians in the present study was very low, being 1/4 to 1/8 of that reported by Hope-Simpson⁶⁾ and 1/2 to 1/4 of that reported by Ragozzino *et al.*⁷⁾ This may have been influenced by the fact that the number of subjects was smaller than in those studies. All of the

pediatricians who had had herpes zoster in their fifties were in poor physical condition or had not seen patients with chickenpox or herpes zoster, but half of those who had had it in their sixties were in good physical condition and had seen such patients. This observation suggests that activated specific cellular immunity from reexposure in the sixties may be weaker than that in the fifties. As a result, even if a person is in good physical condition, he may not be protected against herpes zoster. It has been reported that the older people are the weaker in activated specific cellular immunity after varicella vaccination.¹⁾ Therefore, the efficacy of administration of the varicella vaccine for protection against herpes zoster may be greater in persons in their fifties than in older people. In addition, based on our observation (data not shown) and other reports,^{6,7)} the incidence of herpes zoster rises rapidly from the forties through the fifties, the biggest difference in the incidence of this disease between pediatricians and the general population occurs in the fifties, and the incidence of postherpetic neuralgia rises after sixty years of age.⁸⁾

The possibility that varicella vaccine itself might cause the development of herpes zoster is low, because the incidence of herpes zoster after varicella vaccination as protection against chickenpox in children with leukemia has been significantly lower than in that who have had natural chickenpox.⁹⁾ The booster effect from frequent reexposure to VZV experienced by pediatricians may be different from the effect of the varicella vaccine, but activated cellular immunity can be attained as a result of both. Hayward *et al*¹⁾ reported that the increase in VZV-specific cellular immunity after herpes zoster was quantitatively similar to that obtained in age-matched elderly people after vaccination. Because a second form of herpes zoster is rare in otherwise normal people, it also suggests that varicella vaccine may protect one against herpes zoster. The period between the first and second forms of herpes zoster was more than 20 years in the two pediatricians in this study who had had the second form of herpes zoster. Thus we may infer that the activated cellular immunity after varicella vaccination may protect against the onset of herpes zoster and postherpetic neuralgia or lessen them. Further investigation of the efficacy of the varicella vaccine for protection against herpes zoster is required as well as studies of cost and benefits.

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REFERENCES

- 1) Hayward A, Levin M, Wolf W, Angelova G, Gilden D: Varicella-zoster virus-specific immunity after herpes zoster. *J Infect Dis* **163**: 873-875, 1991
- 2) Takahashi M, Iketani T, Sasada K, Hara J, Kamiya H, Asano Y, Baba K, Shiraki K: Immunization of the elderly and patients with collagen vascular diseases with live varicella vaccine and use of varicella skin antigen. *J Infect Dis* **166**(Suppl1): S58-62, 1992
- 3) Sørensen OS, Haahr S, Møller-Larsen A, Wildenhoff K: Cell-mediated and humoral immunity to herpesvirus during and after herpes zoster patients. *Infect Immun* **29**: 369-375, 1980
- 4) Terada K, Kawano S, Yoshihiro K, Morita T: Proliferative response to varicella-zoster virus is inversely related to development of high levels of varicella-zoster virus specific

- IgG antibodies. *Scand J Infect Dis* **25**: 775-778, 1993
- 5) Arvin AM, Koropchak CM, Wittek AE: Immunologic evidence of reinfection with varicella-zoster virus. *J Infect Dis* **148**: 200-205, 1983
 - 6) Hope-Simpson RE: The nature of herpes zoster: a long-term study and a new hypothesis. *Proc R Soc Med* **58**: 9-20, 1965
 - 7) Ragozzino MW, Melton LJ, Kurtland LT, Chu CP, Perry HO: Population-based study of herpes zoster and sequelae. *Medicine* **7**: 174-178, 1982
 - 8) Gildea DH: Herpes zoster with postherpetic neuralgia-persisting pain and frustration. *N Engl J Med* **330**: 932-934, 1994
 - 9) Hardy IB, Gershon AA, LaRussa PS, Steinberg SP: The incidence of zoster after immunization with live attenuated varicella vaccine: a study in children with leukemia. *N Engl J Med* **325**: 1545-1550, 1991