

## New vaccine for an old problem

Laboratory Centre for Disease Control

**V**aricella zoster virus is a DNA virus belonging to the *Herpesvirus* genus. It can produce prodromal symptoms of fever, malaise, and upper respiratory tract infection before rash appears. Characteristic lesions appear in successive crops during the first 3 to 4 days of illness. Lesions progress from macule to vesicle to pustule to scab over a few days. Varicella increases the risk of severe invasive Group A  $\beta$ -hemolytic streptococcus infection among previously healthy children by a factor of 40 to 60.<sup>1,2</sup>

Susceptibility to varicella is general unless there is protection from previous infection. By age 5, 50% of children will have had varicella, and by age 12, 90%.<sup>3</sup> The lifetime risk of varicella is 95% and of having at least one reactivation of herpes zoster is 15% to 20%.<sup>4</sup>

### Maintaining the cold chain

A lyophilized, live attenuated Oka-strain varicella virus vaccine (Merck Frosst Canada Inc, VARIVAX<sup>®</sup>) was licensed in Canada in December 1998. The vaccine retains potency for at least

18 months when kept frozen at or below  $-15^{\circ}\text{C}$ . Each 0.5-mL dose also contains 25 mg of sucrose, 12.5 mg of hydrolyzed gelatin, trace amounts of fetal bovine serum and neomycin, and residual components of human diploid (MRC-5) cells. The vaccine does not contain any preservatives.

Cold chain requirements *must* be strictly observed because the vaccine is highly heat-sensitive. The vaccine must be kept frozen at an average temperature of  $-15^{\circ}\text{C}$  or colder. When unfrozen it retains potency before reconstitution for up to 72 continuous hours at refrigerator temperature ( $2^{\circ}\text{C}$  to  $8^{\circ}\text{C}$ ); *vaccine not used within this period should be discarded*. The vaccine can be reconstituted and stored at room temperature for a maximum of 30 minutes without loss of potency. *Reconstituted vaccine must be discarded if not used within 30 minutes, because of possible loss of potency*. If the vaccine is to be transported without a freezer, it should be kept frozen at  $-15^{\circ}\text{C}$  in a suitable container with an adequate quantity of dry ice. Container temperature must be monitored carefully to ensure that temperature is

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maintained at  $-15^{\circ}\text{C}$  or colder. Do not refreeze either lyophilized or reconstituted vaccine.

### **Effective protection**

Detectable varicella antibodies (ELISA  $>0.6$ ) have been reported in more than 99% of children who received one dose from 1 to 4 years after vaccination and in more than 96% up to 7 years after vaccination.<sup>5</sup> Among healthy adolescents and adults who received two doses 4 to 8 weeks apart, detectable antibody levels remained in more than 97% of them up to 3 years after vaccination. With regard to efficacy, it is estimated that the vaccine will offer 70% to 90% protection against varicella of any severity and 95% protection against severe varicella for at least 7 to 10 years after vaccination.

Varicella vaccine is recommended for primary vaccination of healthy people 12 months old and older who are susceptible to the disease. Children aged 12 months to 12 years should receive the full contents of a single-dose vial of vaccine (about 0.5 mL of reconstituted vaccine). People 13 years old and older should receive two full doses, at least 28 days apart. There is no need to restart the schedule if administration of the second dose is delayed. The vaccine should be administered subcutaneously.

Postimmunization serologic testing for immunity is not considered necessary. Booster doses after primary vaccination are not indicated.

Varicella vaccine can be safely given with measles, mumps, and rubella vaccines, Pentacel<sup>®</sup> or Quadracel<sup>®</sup>, at separate sites and with separate syringes at a single visit. If not given concomitantly with measles, mumps, and rubella vaccines, the vaccine should be given at least 28 days later. Other live vaccines should be administered at the same time as, or at least 28 days apart from, varicella vaccine.

### **Contraindications**

Contraindications to use of the vaccine are:

- a history of hypersensitivity to any component of the vaccine,
- immunocompromised status (refer to the “Statement on Recommended Use of Varicella Virus Vaccine”<sup>6</sup> for exceptions), and
- pregnancy: the effects of varicella virus vaccine on fetal development are unknown; therefore vaccine should not be given to pregnant women. No data suggest that live attenuated varicella vaccine given accidentally during pregnancy is teratogenic.

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No evidence indicates that varicella vaccine virus is transmitted in the absence of a rash. If a rash develops, it should be covered. If this is impossible, contact with susceptible persons at high risk of severe complications (newborns and immunocompromised individuals) should be minimized.

Immune response might be low if varicella vaccine is given after transfusion of blood (except washed red blood cells) or plasma, or after administration of immune globulin or varicella zoster immune globulin.

Live vaccines are generally contraindicated for people undergoing long-term systemic steroid therapy, although people taking low-maintenance doses of immunosuppressive drugs could likely receive the varicella vaccine safely. Consultation with specialists is recommended when varicella vaccination is being considered for children receiving high doses of systemic steroids.

Breastfeeding is not a contraindication to varicella vaccination of mothers or children.

### Safety

Varicella vaccine is very safe. With the exception of hypersensitivity, a reaction to the first dose of varicella vaccine is not a contraindication to a subsequent dose.

Even though varicella vaccine has not been shown conclusively to be protective when given after exposure, it

could provide some immediate protection and will protect against future exposure. ❖

*This report is a summary of the National Advisory Committee on Immunization's Statement on Recommended Use of Varicella Virus Vaccine.<sup>4</sup>*

### References

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3. Law BJ, Brownell MD, Walld R, Roos L. *Chickenpox in Manitoba: a population-based assessment using the Manitoba Health Services Commission Database*. Poster presentation. 3rd National Immunization Conference; 1998 December 6-9. Calgary, Alta.
4. Gershon AA, Takahashi M, White CJ. Varicella vaccine. In: Plotkin, E, Orenstein WA, editors. *Vaccines*. 3rd ed. Philadelphia, Penn: WB Saunders Co; 1999. p. 475-507.
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