Measles vaccination: Weighing the benefits and risks of a live viral vaccine for HIV-infected children

Children who are immunocompromised are at a higher risk of severe disease from measles but also have a lower response rate to immunization and a higher risk of serious adverse events from the vaccine. The medical literature describes cases of measles in human immunodeficiency virus (HIV)-infected children (1), small series reporting the serological responses to measles vaccination (2-8) and case reports of serious adverse events after measles immunization in immunocompromised hosts (9-14). Clearly, a description of both the possible outcomes and the likelihood of their occurrence are necessary when deciding on the benefits and risks of measles vaccination in HIV-infected children.

As of 1992, 117 cases of measles in immunocompromised hosts have been reported; 27 were HIV-infected, 16 from Africa and 11 from the United States (1). Because there may be many factors contributing to the mortality rate from measles in African children this information cannot be generalized to Canadian children. Among the American cases nine (82%) developed pneumonia and three (27%) died.

It might be expected that children with HIV infection would have a lower seroresponse rate to measles immunization than healthy children. Retrospective studies show that prevalence rates of measles antibody ranged from 25% to 79% in children infected with HIV at various intervals after immunization (2-5). In a cohort of HIV-infected children in New York, antibody to measles, measured by ELISA, developed in two of eight (25%) children (mean age 23 months) immunized and followed prospectively (2). In Philadelphia during a measles outbreak, 15 HIV-infected infants between six and 12 months of age were vaccinated with measles vaccine and 12 HIV-infected children 12 to 15 months of age received the measles, mumps and rubella (MMR) vaccine (6). An antibody response, measured using ELISA, occurred in 15 of the 25 (60%) children. However, the response rate was higher in the group of six- to 12-month-olds than in the group of 12- to 15-month-olds (nine of 13 being antibody-positive versus six of 12). Interestingly, at six months of age, only one of 23 infants born to mothers with HIV infection had measurable measles antibody pre-immunization. Similar results were found in African children where none of 24 HIV-infected infants had measles antibodies at six months of age (7).

No adverse outcomes to measles vaccine were reported in the small studies discussed above. In a retrospective survey conducted by the New York City Department of Health, the vaccination histories of 319 HIV-infected children were reviewed (15). MMR vaccine was known to have been given to 70 of these children and no vaccine-associated illnesses were documented. However, fatal infection has been reported as a rare complication in children with immunodeficiencies other than HIV infection who were immunized with the original Edmonston B measles vaccine and more recently with the MMR vaccine (9-12). A fatal case of measles vaccine virus infection in a 21-year-old with AIDS has recently been reported (13). The ability of the measles vaccine to cause neurological disease, including measles encephalopathy peculiar to immunocompromised hosts, remains controversial (14).

In Canada, there were 2348 reported cases of measles in 1995 (eight per 100,000) which is the highest number since 1992 (16). None of these cases was known to have occurred in a child with HIV infection. In 1996, several provinces implemented a two-dose measles vaccine program. Therefore the expected number of cases of measles should decrease over the next few years. The goal is to eliminate indigenous measles in Canada by the year 2000.
In the guidelines by the National Advisory Committee on Immunization (NACI) and the American Advisory Committee on Immunization Practices, it is recommended that all children with HIV infection receive the MMR vaccine (17,18). It is time to review this recommendation taking into account the expected decrease in incidence of measles with the two-dose measles vaccine program and the risk of rare but fatal complications from measles vaccine in HIV-infected individuals. Since children with HIV infection are likely to experience progressive deterioration of their immune function, physicians should consider deferring the second dose of measles vaccine until guidelines from NACI are available. For HIV-infected children with symptomatic disease or laboratory evidence of immune deficiency (Table 1), physicians must consider whether they should be treated as other immunocompromised children, ie, a group in whom live attenuated viral vaccines are contraindicated. For the asymptomatic HIV-infected infant with no evidence of immune suppression based on the CD4 cell count, consideration should be given to the potential benefit of earlier administration of both the primary and booster measles vaccine, since maternal measles antibody is likely to be absent by six months of age and the infant's immune function is likely to deteriorate, not improve, with age.

**REFERENCES**
