Abstract

Varicella zoster virus (VZV) is a highly contagious virus that affects people worldwide. The incidence of varicella appears to vary among regions with different climates, population densities, and degrees of development. However, morbidity and mortality statistics are almost non-existent in Taiwan and other tropical or less developed regions. The aims of this study were to explore the varicella IgG seroprevalence and factors associated with the susceptibility among children under 12 years old in Taiwan.

We collected residual serum from 13 hospitals around the island. Varicella IgG antibodies were examined by the Enzygnost Anto-VZV/IgG (Dade Behring). There were 1401 valid results. In addition to the test results, 656 parents also answered a questionnaire, which included history of exposure, history of vaccination, history of infectious diseases, family social economic status, etc. These responses allowed the analysis of factors associated with the susceptibility of varicella.

Varicella IgG antibodies seropositivity increased as age increased after 1 year old. In northern Taiwan, seropositivity greatly increased from 14.3% to 52% in 2-3 years old, it became 67% in 4-7 years old and 88.0% in 8-12 years old. Similar to northern Taiwan, the seropositivity was 90% in 8-12 years old in central Taiwan. In southern Taiwan, the extent of infection was lower than that of northern and central Taiwan, the seropositivity was 76.1% in 8-12 years old. In eastern Taiwan, the extent of infection was low before 8 years old, it greatly increased to 93.8% in 8-12 years old, suggesting later infection during childhood. Although lower in eastern Taiwan, the maternal antibodies in infant were not significantly different across living areas. The seroprevalences were significantly different across areas in all age groups except in infant. The seroprevalences of maternal antibodies were significantly different between infants in mass vaccination area and in private vaccination area. In 1 year old children, the seropositivity prevalence decreased in both areas (20% and 10%, respectively). The seropositivity significantly differed between these two areas in children 2-5 years old. This differences were not significantly different after 6 years old. The results of multiple logistic regression revealed that varicella susceptibility was independently associated with age, living areas, history of receiving varicella vaccine and influenza vaccine, history of varicella, history of ever contacted varicella cases, family income, and father's occupation. The extent of sub-clinical varicella infection also increased as age increased. It was 8.9%, 31.5%, and 52.2% for age groups of 1-2 years, 7-8 years, and 11-12 years, respectively.

This seroprevalence study was completed before the initiation of national comprehensive varicella vaccination program. In addition to estimating the size of susceptible population and extent of sub-clinical infection, we also analyzed the factors associated with the susceptibility of varicella. The results showed that the size of the susceptible population in mass vaccination area was smaller than that in private vaccination area, which, at least partially in some younger age groups, suggested the effect of vaccination. The long-term effect of national varicella vaccination program needs further follow-up study.

Keywords：Varicella；Varicella vaccine；Seroepidemiology study