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Title:

Epidemiology of Breakthrough Varicella after the Implementation of Universal Vaccination Program in Taiwan, 2004–2014

Abstract Text:**Backgrounds:**

National one-dose varicella vaccination at 12 months of age was implemented in Taiwan since 2004 and resulted in tremendous decline of varicella. Two types of varicella vaccines were used: Varivax[®], mostly during 2004–2006, and Varilrix[®], mostly during 2007–2008. Recently, breakthrough varicella infection (BVI) has raised the issue about the necessity of a second dose. Our study aimed to evaluate the timing, rate of BVI and its risk factors in post-vaccine era.

Methods:

We retrospectively identified children who received varicella vaccine during 2004–2008. Information on national identification number, sex, date of birth, date of vaccination, and vaccine manufacturer were extracted from national vaccination registry system. Using national identification number, this vaccinated cohort was linked to the 2004–2014 National Health Insurance database. BVI was defined as diagnosis of varicella (ICD-9-CM codes 052 and 052.0–052.9) beyond 42 days after vaccination. We used multiple cox regression model to assess risk factors for BVI.

Results:

Total 985,125 vaccinees were included. BVI occurred among 29,108 (3.0%) vaccinees and 230 (0.024%) required hospitalization. Mean age at vaccination and at BVI was 1.25 and 4.87 years, respectively. Female and Varivax[®] recipients had lower risk of BVI, compared with male (hazard ratio [HR] 0.85, 95% confidence interval [CI] 0.83–0.87) and Varilrix[®] recipients (HR 0.63, 95% CI 0.61–0.65). Annual BVI rate at 1, 6, 10 years after Varilrix[®] vaccination was 3.66, 5.28 and 3.36 per 1000 person-year, and 4.22, 2.58, and 2.35 per 1000 person-year after Varivax[®] vaccination.

Conclusions:

Incidence and clinical severity of BVI was still low with one-dose varicella vaccination program in Taiwan. A second dose of varicella vaccine targeting Varilrix[®] recipients might further reduce BVI.

Keywords: vaccine, varicella, breakthrough infection, effectiveness, immunization
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