

RESEARCH ARTICLE

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Immunity and clinical efficacy of an inactivated enterovirus 71 vaccine in healthy Chinese children: a report of further observations

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Abstract

Background: To investigate the long-term effects on immunity of an inactivated enterovirus 71 (EV71) vaccine and its protective efficacy.

Methods: A sub-cohort of 1,100 volunteers from Guangxi Province in China was eligible for enrolment and randomly administered either the EV71 vaccine or a placebo on days 0 and 28 in a phase III clinical trial and then observed for the following 2 years with approval by an independent ethics committee of Guangxi Zhuang Autonomous Region, China. Serum samples from the 350 participants who provided a full series of blood samples (at all the sampling points) within the 2-year period were collected. Vaccine-induced immune effects, including the neutralizing antibody titres and cross-protection against different genotypes of EV71, were examined. This study also evaluated the protective efficacy of this vaccine based upon clinical diagnosis.

Results: This sub-cohort showed a >60 % drop-out rate over 2 years. The seroconversion rates among the 161 immunized subjects remained >95 % at the end of study. The geometric mean titres of neutralizing antibodies (anti-genotype C4) 360 days after vaccination in 350 subjects were 81.0 (subjects aged 6–11 months), 98.4 (12–23 months), 95.0 (24–35 months), and 81.8 (36–71 months). These titres subsequently increased to 423.1, 659.0, 545.0, and 321.9, respectively, at 540 days post-immunization (d.p.i.), and similar levels were maintained at 720 d.p.i. Higher IFN- γ /IL-4-specific responses to the C4 genotype of EV71 and cross-neutralization reactivity against major EV71 genotype strains were observed in the vaccine group compared to those in the placebo group. Five EV71-infected subjects were observed in the placebo-treated control group and none in the vaccine-immunized group in per-protocol analysis.

Conclusion: These results are consistent with the induction of dynamic immune responses and protective efficacy of the vaccine against most circulating EV71 strains.

Trial registration number: Clinicaltrials.gov, NCT01569581, Trial registration date: March 2012

Keywords: Cross-neutralization, Enterovirus 71, Hand, foot, and mouth disease, Inactivated vaccine, Long-term effect

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