Oral polio vaccine interferes with full-course rotavirus vaccine immunogenicity: an individual level analysis of pooled clinical trial data in high and low child mortality settings

[1]JM Baker, [2]JE Tate, [1]BA Lopman, [1]J Leon, [1]MJ Haber
[1]Rollins School of Public Health, Emory University, [2]United States Centers for Disease Control and Prevention

Background
Individual-level characteristics may influence rotavirus vaccine immunogenicity. We aimed to estimate the effect of oral poliovirus vaccine (OPV) co-administration and other individual-level characteristics on Rotarix vaccine immunogenicity in high and low child mortality settings.

Method
Pooled, individual-level data from 22 phase II/III clinical trials of Rotarix vaccine across 33 countries/territories were analyzed. Immune response was examined using seroconversion (appearance of serum anti-rotavirus immunoglobulin A in subjects initially seronegative) collected approximately 4-12 weeks after the last rotavirus vaccine dose. Child mortality stratum was defined based on under 5 mortality rates. Data were analyzed using mixed effect logistic regression to identify individual and country-level predictors of seroconversion while accounting for between-trial variation.

Results
We analyzed data from 4,434 and 2,846 vaccinated infants in low and high child mortality settings, respectively. A higher proportion of infants seroconverted in low child mortality settings (77%) compared to high child mortality settings (62%, $p<0.001$). Infants who received OPV concomitantly with both their first and second doses of rotavirus vaccine were 37% less likely to seroconvert (adjOR=0.63, 95% CI=0.47, 0.84) compared to infants who received OPV but not concomitantly with either rotavirus dose. Shorter time from the last rotavirus dose to serology sample collection (adjOR=0.90, 95% CI=0.86, 0.94) and reduced vaccine concentration ($<10^{6.0}$ $CCID_{50}$, adjOR=0.65, 95% CI=0.49, 0.87) were also associated with lower odds of seroconversion. Increased odds of seroconversion were associated with older age at first rotavirus vaccine dose (adjOR=1.13, 95% CI=1.08, 1.17) and living in a country with a higher gross domestic product (adjOR=1.11, 95% CI=1.04, 1.19).

Conclusion
Our findings suggest that OPV given concomitantly with Rotarix is a substantial contributor to reduced immunogenicity when given with both the first and second rotavirus vaccine doses. Additional research into the relationship between concomitant OPV and immunogenicity of other rotavirus vaccines is needed.