

Diverse IgA response to Rotarix® during the first three years of life in South African infants

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Serum Immunoglobulin A (IgA) has been used as a proxy to measure the immunogenicity of oral rotavirus vaccines. However, the duration and magnitude of rotavirus (RV)-specific IgA levels are unknown among children in developing countries where vaccines are much less effective. We assessed the kinetics of RV-antibodies, through the first three years of life in infants immunized with the monovalent human rotavirus vaccine (Rotarix®). We also evaluated the effect of glycoproteins on immunogenicity to Rotarix®.

Two doses of Rotarix® were given at 1.5 and 4 months of age to Infants in Soweto, South Africa. Blood specimens were obtained at 1.5 (pre dose 1), 4 (post dose 1), 5 (post dose 2), 9, 25, and 38 months of age. Serum RV-specific IgA (titers); lactoferrin (ng/ml) and lactoadherin (pg/ml) were measured by EIA. Seroconversion was defined as a ≥ 4 fold rise in IgA titers at post dose 1 or post dose 2 compared to pre dose 1.

RV-specific IgA seroconversion was 39% (59/152) at post dose 1, and 63% (92/152) at pose dose 2. Post dose 2-responders (R) had significantly higher IgA GMTs (95%CI) compared to non-responders (NR) at 4 months of age [R: 89 (58-136) vs NR: 36 (22-58), $p=0.006$]; 5 months of age [R: 381 (288-503) vs. NR: 40 (26-62), $p<0.001$]; 9 months of age [R: 133 (90-196) vs NR: 53 (30-95), $p=0.010$]; at 25 months of age [R: 481 (284-934) vs NR: 145 (51-414), ($p=0.043$)], and 38 months of age [R: 589 (332-1,044) vs NR: 133 (41-428), ($p=0.024$)]. Additionally, lactoferrin GMC (95%CI) was 1,026 (894-1,177) and 1,149 (1,039-1,269) at 1.5 and 4 months of age, respectively; while lactoadherin was 4,068 (3,377-4,901) and 5,193 (3,932-6,858). There were not significant differences in concentrations of glycoproteins between responders and non-responders.

Infants who responded to Rotarix® at 5 months of age had sustained higher IgA at 9, 25 and 38 months, whereas children who did not seroconvert remained unresponsive or had much lower IgA despite exposure to natural infection. No relationship was found between concentrations of glycoproteins and Rotarix® immunogenicity.