Early EBV Infection in Kenyan Infants by 6-Months and Response to Measles Vaccination

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Abstract

Measles is a vaccine preventable disease, but still has a significant disease burden worldwide. In 2019, there were more than 207,000 deaths due to measles. In Sub-Saharan Africa, one of the most affected areas by measles, there is decreased measles vaccine efficacy. Previous work done by Whittle and colleagues in 2010 showed that early infection with Epstein-Barr Virus in infants in the Gambia was correlated to decreased response to measles vaccination. Additionally, in their study there appeared to be a protective effect by CMV infection. The objective of our study was to assess response to measles vaccination in infants infected with EBV by 6-months of age and whether infection with CMV at 12-months appeared to be protective. Our study utilized samples from the Chulaimbo Antenatal Postnatal (CHAP) study based in Chulaimbo County, Kenya, which followed infants through 2 years of age. Infants who had documented measles vaccination, confirmed EBV status by 6-months, and confirmed CMV status at 12-months were included in data analysis, resulting in 109 infants. EBV status was confirmed by Q-PRC. Response to measles vaccination and CMV status were confirmed by indirect ELISA. Infants who were EBV+ at 6-months had significantly lower normalized OD values (p-value = 0.030; 95% CI = -0.665 to -0.034), while infants who were both EBV+ and CMV+ had greater OD values than those who were EBV+ and CMV- (p-value = 0.007; 95% CI = 0.0264 to 1.623). Our results replicated the previous finding by Whittle and colleagues in a sample of infants from a different region in Sub-Saharan Africa. Additionally, we had confirmed infection with EBV by 6-months of age by Q-PCR, adding strength to hypothesis that the timing of EBV infection is important to measles vaccine response. We believe that this presents a possible opportunity for measles cases to occur and cause outbreaks, leading to increased burden of disease. The exact mechanism of how EBV disrupts the immune system was not elucidated in our study, but as it is a B-cell tropic virus, we believe that it is likely interfering with the humoral response to vaccination. Future studies should investigate the biologic mechanism and should assess anti-measles IgG in infants in a longitudinal manner following vaccination.