Impact of Rotavirus Vaccination on All-Cause and Rotavirus-Specific Gastroenteritis and Strain Distribution in Kiambu, Central Kenya: 11-Year Surveillance

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BACKGROUND: Rotavirus is the leading cause of severe childhood acute gastroenteritis (AGE) globally. Safe and effective vaccines are considered to be a high-impact and cost-effective public health intervention tool to greatly reduce the burden of AGE. A monovalent rotavirus vaccine was introduced into the National Immunization Program in Kenya in July 2014. The study evaluated the impact of the vaccine on hospitalization for all-cause and rotavirus-specific gastroenteritis and strain distribution in Kiambu, Central Kenya five years following vaccine implementation.

METHODS: Data on all-cause and rotavirus-specific AGE and strain distribution were derived from an 11-year hospital-based surveillance at Kiambu County Referral Hospital (KCH) between 2009 and 2020. Fecal samples were collected from children <5 years presenting with AGE. The samples were screened for group A rotavirus using ELISA and genotyped using multiplex semi-nested RT-PCR and direct Illumina Miseq next-generation sequencing.

RESULTS: Following the vaccine introduction, there was a prevalence of 10.1% (95% CI 9.8%-10.5%) and a monthly median of 24 for all-cause AGE, down from a monthly median of 97 recorded in the pre-vaccine period. This represented a reduction of 75.3% in all-cause AGE. Rotavirus-specific AGE was detected at 12.0% (95% CI: 10.6-13.5%), down from 27.5% (95% CI: 25.5-30.1%) observed in the pre-vaccine period, representing a decline of 53.4% (95% CI: 41.5-70.3%). Reductions in rotavirus hospitalizations were greatest among vaccine-eligible children (<12 months), with the peak shifting to older children post-vaccine introduction. Rotavirus AGE ranged predominantly from moderate to severe among the study population. Coverage with the last dose of rotavirus vaccine was 91% with a 6% drop-out, indicating good access and high utilization of the vaccine in the area. G3P[8] was the most predominant strain in post-vaccine, replacing G1P[8] which predominated in the pre-vaccine period. Additionally, we detected considerable proportions of uncommon strains G3P[6] (4.8%) and G12P[6] (3.5%) in the post-vaccine era.

CONCLUSION: The data points to a significant decline in all-cause and rotavirus AGE following the vaccine introduction, thus, providing evidence for a significant public health impact of the vaccine in Kiambu, Central Kenya. The shift in strain distribution could be due to vaccine-selective pressure hence continued surveillance is recommended.