

Association between diarrhoea severity and circulating Rotavirus genotypes in Enugu Nigeria

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Background

Rotavirus is the most important aetiology of severe diarrhoea in children under 5 years in developing countries like Nigeria. We conducted a hospital-based surveillance to examine the possible relationship between the severity of diarrhoea and the various rotavirus G-types circulating in Enugu Nigeria.

Methods

Three thousand four hundred and ninety-seven (3497) diarrhoea stool samples were collected from U5 children with diarrhoea admitted to the paediatric wards of University of Nigeria Teaching Hospital Ituku Ozalla, Enugu Nigeria between 2011 and 2017. Group A rotavirus antigen was determined using ProspecT[®] ELISA Antigen kit (Oxoid, UK). A subset of rotavirus positive samples were subjected to RT-PCR genotyping to determine the VP7 (G-type) and VP4 (P-type) at the African Rotavirus Regional Reference Laboratories. Single G- genotypes were reported in 815 stool samples and were compared to determine severity using modified Vesikari scale.

Results

Forty eight percent (48%) (1681 of 3497) of the stool samples were group A rotavirus positive and genotype was performed on 985 samples. Single genotype (G-types) were reported among 815 samples and included G1 (n= 224; 22.7%), G2 (n= 68; 6.9%), G3 (n=164; 16.7%), G4 (n=10; 1.0%), G8 (n=6; 0.6%) G9 (n=48; 4.6%), G10 (n=56; 5.7%) and G12 (n=239; 24.7%). Among those with G12 rotavirus diarrhoea, very severe diarrhoea (Vesikari score ≥ 16) was seen in 3 (1.3%) children, severe diarrhoea (Vesikari score 11-15) in 126 (52.7%) children, moderate diarrhoea in 102 (42.7%) children and mild diarrhoea in 8 (3.3%) children. Among the children with G1 diarrhoea, 1 (0.4%) child had very severe diarrhoea, 121 (54%) children had severe diarrhoea, moderate diarrhoea was seen in 95 (42.4%) children and mild diarrhoea reported from 7 (3.1%) children. Among the children with G3 specific diarrhoea, 3 (1.8%) children had very severe diarrhoea, 87 (53%) children had severe diarrhoea, moderate diarrhoea was seen among 67 (40.9%) children and mild diarrhoea was seen in 7 (4.3%) children. G4 genotypes was shown to have caused more "very severe diarrhoea" (Vesikari score ≥ 16) followed by G10 genotypes but we not identify an association between these genotypes and overall diarrhoea disease severity (p=0.973).

Conclusion

Diverse rotavirus G-types circulated during this study period and most children showed moderate to severe acute gastroenteritis. The result of this study did not indicate any association between genotypes and diarrhoea severity. Therefore, all the rotavirus genotypes encountered in this study have potentials

to cause moderate to severe and some very severe infections in Nigerian infants. Rotavirus vaccines would be effective against all rotavirus genotypes if introduced into Nigeria's EPI schedule.