Prospective Characterization of Norovirus Compared With Rotavirus Acute Diarrhea Episodes in Chilean Children

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Background: Rotavirus and more recently noroviruses are recognized as main causes of moderate to severe acute diarrhea episodes (ADE) in children ≤5 years of age. Comparing epidemiologic and clinical features of norovirus to rotavirus ADE will aid in the decision-making process required to develop norovirus vaccines.

Methods: Surveillance for ADE occurring in children ≤5 years of age was implemented in the emergency department (ED) and ward of a large hospital in Santiago and Valparaiso, and in 4 outpatient clinics in Santiago. A stool sample was obtained within 48 hours of consultation for rotavirus detection by enzyme-linked immunosorbent assay and noroviruses by enzyme-linked immunosorbent assay or reverse transcription polymerase chain reaction. For ED and hospital rotavirus and norovirus ADE parents were instructed to monitor clinical findings associated with severity until the end of the episode. The 20-point Vesikari score was used to determine disease severity.

Results: Between July 2006 and October 2008 rotavirus and noroviruses were detected in 331 (26%) and 224 (18%) of 1913 ADE evaluated. The proportion of rotavirus-positive samples in hospital ward, ED, and outpatient clinic was 40%, 26% to 30%, and 13% compared with 18%, 17% to 19%, and 14% for noroviruses. Mean age and 25%–75% interquartile interval of children with rotavirus and norovirus ADE were remarkably similar, 15.6 months (9–20), and 15.5 months (9–19), respectively. Rotavirus cases displayed an autumn-winter peak followed 2 to 3 months later by the norovirus peak. The mean (interquartile) for the Vesikari score was 12.9 (11–15) and 11.9 (9–14.5) for rotavirus (N = 331) and norovirus (N = 224) ADE, respectively, $P = 0.003$. Compared with norovirus, rotavirus ADE were more common in the 11 to 16 severity score interval ($P = 0.006$), had a higher maximum stool output in a given day ($P = 0.01$) and more frequent fever ($P < 0.0001$). Duration of diarrhea, presence, duration and intensity of vomiting, and intensity of fever did not differ between viruses. Mixed rotavirus and norovirus infections were uncommon (<1%) and not clinically more severe. Clinical severity of ADE in young infants was similar for rotavirus and lower ($P = 0.03$) for noroviruses compared with older children.

Conclusion: Noroviruses are a significant cause of moderate to severe endemic ADE in Chilean children. Although significantly less severe than rotavirus as a group, most norovirus episodes were moderate to severe clinically. An effective norovirus vaccine would be of significant additional benefit to the current rotavirus vaccine in decreasing disease burden associated with ADE.

Key Words: rotavirus, norovirus, acute diarrhea, gastroenteritis, children, severity

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