Variability in Pediatric Rotavirus Disease in the Post-Vaccine Era

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Abstract:
Since implementation of vaccine, severe rotavirus disease has demonstrated biennial peaks have been poorly understood. We sought to better understand rotavirus epidemiology in the post-vaccine era. Background: Rota virus was the leading cause of severe acute gastroenteritis in children worldwide before licensure of Rotatet and Rotarix.1,2 Since the introduction of vaccine, severe rotavirus disease decreased substantially beginning in 2008. Although only 72% of US children are completely vaccinated for rotavirus, the burden of rotavirus disease has decreased significantly more than estimated to herd protection.1,3 Since implementation of vaccine, RV disease has demonstrated biennial seasonality with peaks of disease in odd years (2009-2013). These biennial peaks have been poorly understood. We sought to better understand rotavirus epidemiology in the post-vaccine era.

Methods: Outcomes

• To characterize seasonality of RV disease in the US by considering prevalence of disease pre- and post-vaccine, as well as in odd and even seasons in the post-vaccine era.

• To examine and vaccine history of individuals with rotavirus in the post-vaccine era.

• Retrospective study of all children ≤18 years old tested for RV at two Children’s Healthcare of Atlanta hospitals (Egleston and Scottish Rite).

• Specimens were sent from inpatient, outpatient, and ED encounters.

• Single academic center based in Atlanta

• A change in the method of testing occurred during the study period.

Exclusion Criteria

• RV positive subjects ≤2 mo. of age were fully vaccinated for RV with no difference between even and odd seasons (16% versus 16%, p = 0.1).

• Patients from ≤18 years old tested for RV at two Children’s Healthcare of Atlanta hospitals (Egleston and Scottish Rite).

• Single academic center based in Atlanta

• A change in the method of testing occurred during the study period.

Results:

• Of 20,769 RV tests reported from July 2000- June 2014, 17,270 (83%) were eligible.

• Of the 17,270, 11,430 were in the pre-vaccine era, and 5,840 were in the post-vaccine era.

• More RV tests were performed during the pre-vaccine seasons than in the post-vaccine era (mean 576 vs 115; P=0.0001).

• RV was identified in 3,454 of 11,430 (30%) tests in the pre-vaccine era and 724 of 5,840 (12%, P<0.0001) tests in the post-vaccine era.

• RV was detected after 6 weeks later post-vaccine (MMWR week 15 vs 6.5; p<0.0001).

• The delay in even seasons was more pronounced than the odd seasons (MMWR week 19 vs 14.0, p<0.0001).

• Children with RV were older in the post-vaccine seasons (3.1 vs 1.6 yrs, p<0.0001) and in the even seasons in the post-vaccine era.

• The number of positive RV tests in the post-vaccine era closely resembled the pre-vaccine era, while rotavirus during even seasons occurred later in the year.

• Improving infant RV vaccination rates could impact the biennial seasonality of RV in the post-vaccine era.

Limitations:

• Single academic center based in Atlanta

• Retrospective data collection

• Positive RV antigen test as surrogate for disease

• A change in the method of testing occurred during the study

Conclusions:

• The number of positive RV tests in the post-vaccine era closely resembled the pre-vaccine era.

• In the post-vaccine era, rotavirus peaked >1 month later in the year.

• Biennial peaks of RV disease seen in the post-vaccine era occurred among older children that were not fully vaccinated.

• During odd seasons, rotavirus epidemiology more closely resembled the pre-vaccine era, while rotavirus during even seasons occurred later and in older children.

• Improving infant RV vaccination rates could impact the biennial seasonality of RV in the post-vaccine era.

References:


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