

Increased expression of pro-inflammatory markers in children with intussusception in South Africa

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Background

Rotavirus vaccines have shown to be generally safe, immunogenic, and efficacious against severe diarrhea in children. However, oral vaccines have been associated with a low risk of intussusception among children in developed and middle-income countries in post-marketing safety evaluations, but not in low and low-middle income African countries. The mechanisms of intussusception are not known.

Method

We investigated the etiology and possible mechanisms of intussusception by examining serum specimens for inflammatory markers among children <3 years of age enrolled in an intussusception surveillance program in South Africa from September 2013 to December 2017. Sera were obtained from intussusception cases (N=430) and control patients (elective surgical control N=224; acute gastroenteritis (AGE) control N=71) with matching age, site and date of admission, and analyzed by 27-plex cytokine assays and C-reactive protein (CRP) ELISA.

Results

We showed that mainly pro-inflammatory cytokines (e.g., IFN- γ , IL-1 β , IL-6, IL-8, and TNF- α) were significantly elevated in sera of intussusception patients compared to those from elective surgical and AGE control patients (1.9-, 14-, 5-, 4-, and 1.5-fold, respectively). In addition, we detected the elevation of selected anti-inflammatory cytokines IL-1RA, IL-4, and IL-5 in intussusception patients compared to the control groups (3.4-, 1.5, and 1.6-fold, respectively). We detected elevated but comparable levels of IL-12p70, MCP-1, and GM-CSF in intussusception and elective surgery patients compared to AGE controls. Furthermore, we found that the inflammatory marker CRP is elevated in intussusception patients (2.6-fold) and AGE controls (1.4-fold) compared to elective surgery controls. However, differences in CRP between AGE and elective surgery controls were not significant.

Conclusion

We demonstrated predominantly inflammatory cytokine profiles in children who developed intussusception in South Africa. Further studies are needed to identify etiological agents of intussusception and investigate mechanisms of specific pathogens in children.