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Título: Cohort study of correlations between intestinal protozoan infection and intestinal barrier, nutritional status and neurodevelopment in infants from São Tomé, Africa

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Introduction

Early and repetitive enteric infections are related to shortfalls in child growth with to long-term consequences on cognitive development.^{1,2,3} *G. duodenalis*, *Cryptosporidium* spp and *E. histolytica* cause diarrhea in younger children⁴ and contribute to disrupt the intestinal barrier and blunt absorptive function⁵, troublesome in the first two year of life, when process of brain development and rapid growth is taking place⁶. Studies about consequences of infection by enteric protozoan on infant growth are few contributing to the invisibility of the problem.

Objective: To evaluate the association between intestinal protozoan infections and intestinal barrier, nutritional status and neurodevelopment in a cohort of infants from São Tome, Africa.

Materials and methods: a prospective cohort study was conducted in three districts of São Tome (STP). 500 newborns were recruited between March and June 2013 and followed periodically from birth up to 24 months for: 1. Anthropometric measurement of weight, length and middle arm circumference computed to obtain indicators of length –for-age (HAZ), weight-for-age (WAZ), weight-for-length (WHZ) Z scores to define stunting, underweight and wasting respectively when <-1SD. 2. Neurological assessment by applying Bayle Neurodevelopmental Infant Screener (BINS)⁷ 3. Parasitological analysis of stool (direct wet smear, formalin–ether sedimentation), and Kinyoun staining. 4. Intestinal barrier

function by testing fecal Alpha 1 Antitrypsin (AAT) and S100A12 by Elisa technique. A preliminary descriptive analysis using STATA 13.1 software package was conducted and further statistical analysis is ongoing.

Results: 287 children completed the follow-up. Attained length (85.60 cm vs 87.10 cm) and weight (11.37 kg vs 11.85 kg) was lesser at age of 2y compared to reference population⁸. A high proportion mild stunting (20 to 30%), underweight (15-24%) and wasting (5- 17%) was detected, while moderate and severe forms account for the 5% of the malnourished infants. Infants showed normal BINS scores at the beginning, but after 1 y BINS scores were lower, placing infants in moderate risk for poor development; expressive and cognitive areas were the most affected. Infants infected with intestinal parasites increased from 4% to 35% at 24 m. *G. duodenalis* was the most frequent (2.5% to 18%); *A. lumbricoides* the second (\approx 10%); and *Cryptosporidium* spp (1.7% to 4.4%). Inflammatory markers were tested in 81 infants. Mean values for AAT were lower in infants never infected (170.54 ug/g \pm 170.54) vs. infected (239.75 ug/g \pm 208.9). No differences between groups were observed for S100A12.

Conclusion

G. duodenalis and *Cryptosporidium* spp. infect gastrointestinal tract at early ages and the results suggest an increased intestinal permeability for the infants infected. Mild undernutrition and moderate risk for poor development were frequent.

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