Aetiology of Acute Gastroenteritis in Hospitalized Children from Lisbon Area

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Introduction

Gastroenteritis is a major cause of morbidity and mortality worldwide. In Portugal, acute gastroenteritis is one of the most frequent disease in paediatric age, being the second leading cause of hospitalization, after respiratory infections.

Aim

The aim of this study was to determine the etiology of gastroenteritis in a cohort of children hospitalized due to acute gastroenteritis.

Materials and Methods

From May 2011 to February 2012, stool specimens were collected from children hospitalized for acute diarrhea in two main Hospitals in the Lisbon area. For each child, a stool sample was collected in a sterile container, as well as questionnaire with demographic, clinical and epidemiologic data.

Viral RNA or DNA was isolated using the automated NucliSens® EasyMAG™ (bioMérieux, France).

Adenovirus serotypes 40 and 41, Astrovirus, Norovirus genogroups I and II and Rotavirus were detected by RT-PCR multiplex (Seeplex® Diarrhea ACE Detection, Seegene, Korea) and PCR fragments were separated by 2.0% agarose gel electrophoresis; Sapovirus, Enterovirus and Parechovirus were detected by RT followed by real-time PCR with TaqMan probe.

Stool specimens were also tested for enteric bacteria and parasites, by conventional methods (culture, direct microscope examination and ELISA).

Results I – Enteric Agents distribution

A total of 102 children participated in this study, mean age 3.7 years, range 1 day to 17 years old, comprising 54 (52.9%) boys and 48 (47.1%) girls. None of the children were currently taking antibiotics.

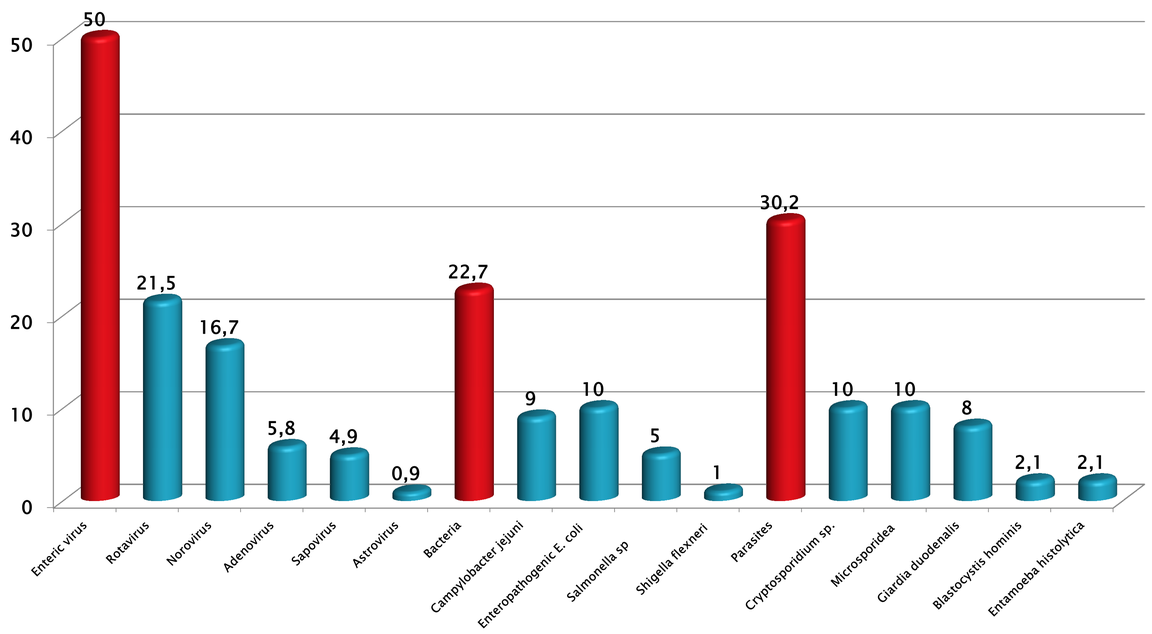
All but 5 children presented with acute diarrhea, accomplished by vomiting (68.3%), fever (56.2%), abdominal pain (37.3%), dehydration (31.4%) and respiratory symptoms (24.5 %).

From the 102 stool samples, 51 (50%) were positive for enteric virus, 23 of 101 (22.7%) were positive for bacteria and 29 of 96 (30.2%) positive for parasites (Figure 1).

Enterovirus and Parechovirus were detected in 20.6% (n=21) and 14.7% (n=15) of the cases, although most were co-detected with other virus.

Only for 13.7% (14/102) of the children, no infectious aetiology was found.

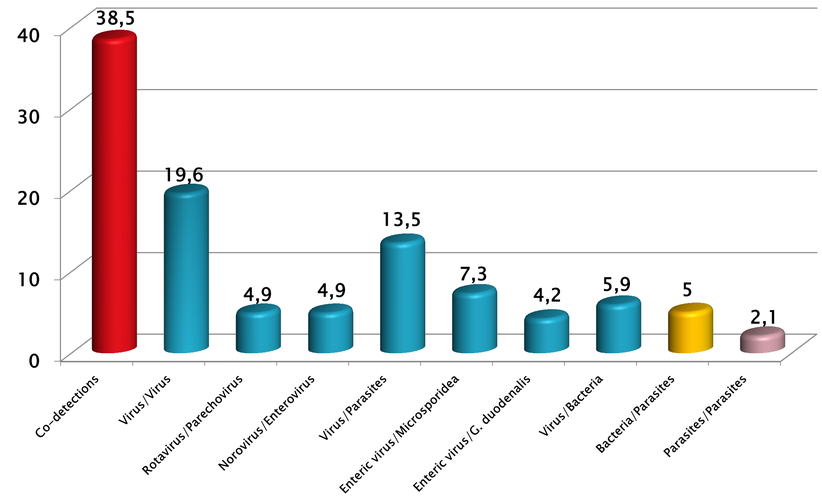
Figure 1–Enteric agents distribution (%)



Results II – Co-detections

Detection of more than one agent was observed in 38.5% of the children; the most common co-detections were two virus: Norovirus with Enterovirus (n=5) and Rotavirus with Parechovirus (n=5) , and a virus with a parasite (n=14) (Figure 2).

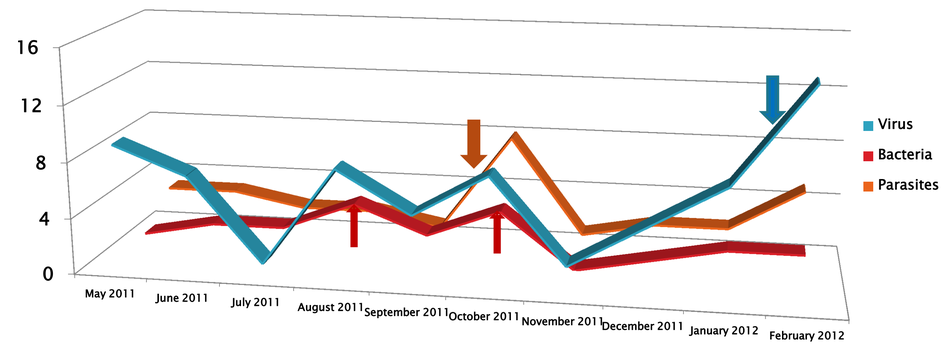
Figure 2– Frequency of the main co-detections (%)



Results III – Seasonal distribution

Seasonal peaks were observed in February 2012 for virus, in October 2011 for parasites and in August and October 2011 for bacteria (Figure 3).

Figure 3–Seasonal distribution of enteric agents

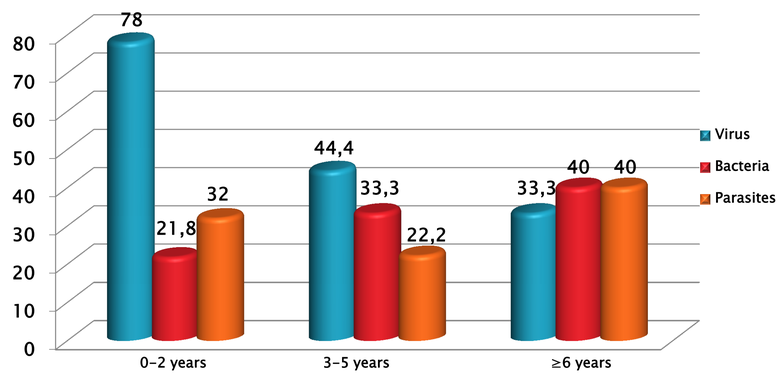


Differences in the seasonality of the virus were observed, specially for Rotavirus with a marked peak in February, while Norovirus was equally distributed along the months of the study.

Results IV– Distribution of enteric agents by age

Virus are the leading cause of acute diarrhea in children aged <5 years (OR=4.92, p<0.001), while bacteria and parasites were the most frequent in children aged >6 years (Figure 4).

Figure 4– Enteric agents distribution by age (%)



Conclusions

- A wide variety of enteric agents were observed among Portuguese children presenting acute gastroenteritis, although virus were the most common, affecting specially young children.
- More than one agent was detected in nearly half of the children, mostly more than one viral agent or a virus and a parasite.
- The co-detection of Parechovirus and Enterovirus with well established enteric viruses suggests that their role as a cause of enteric disease needs to be further investigated.
- The cases for which no infectious aetiology was found (13,7%), suggests that other emergent agents, like Aichi virus, are probably implicated.

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