

# THE ETIOLOGY OF BACTERIAL ENTEROCOLITIS IN CHILD – PRELIMINARY RESULTS

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**Keywords:** diarrhea, Shigella, Salmonella, EPEC, stool cultures

**Abstract:** Acute diarrhea is one of the main causes of morbidity and mortality for pediatric population. Bacterias causes 10% of infectious enterocolitis. It is necessary to do a study about the prevalence of bacterial enterocolitis in children. The author studied the registers of stool cultures from the laboratory of the Pediatric Clinic of Sibiu. It was found 297 positive stool examinations for Salmonella (164), Shigella (103), Yersinia enterocolitica (19), EPEC (9), EIEC (1) and Plesiomonas shigelloides (1).

**Cuvinte cheie:** diaree, Shigella, Salmonella, EPEC, coprocultură

**Rezumat:** Boala diareică acută reprezintă una dintre principalele cauze de morbiditate și mortalitate ale populației pediatrice. Bacteriile cauzează aproximativ 10% dintre enterocolitele infecțioase. Am studiat registrele de coproculturi ale laboratorului Clinicii de Pediatrie Sibiu, din perioada anilor 1999 – 2007, precum și fișele de observație ale pacienților cu coproculturi pozitive din aceeași perioadă. În urma analizării registrelor de coproculturi am descoperit 297 de coproculturi pozitive pentru germeni patogeni intestinali cerți și anume: Salmonella (164 de cazuri), Shigella (103 cazuri), Yersinia enterocolitica (19 cazuri), EPEC (9 cazuri), EIEC (1 caz) și Plesiomonas shigelloides (1 caz).

## INTRODUCTION

Acute diarrhea is one of the main causes of mortality and morbidity in childhood all over the world. Diarrheal disorders in childhood causes a large proportion of childhood deaths (approximately 18%). The World Health Organization (WHO) suspects that there are over 700 million episodes of diarrhea annually in children under 5 years of age in developing countries. Infectious enterocolitis are caused by viral, bacterial and parasitic pathogens. The viruses causes 60-70% from infectious enterocolitis and the bacterial pathogens approximately 10%. But the proportion of bacterial enterocolitis seems to be higher, because even in the U.S.A the percent of positive stool cultures in cases of suspected bacterial enterocolitis is about 50% (58% using the most advanced laboratory techniques). (2, 7) The severity of the episodes of diarrhea is different geographically. In the U.S.A are reported about 20 – 35 millions episodes of diarrhea annually, which appears at approximately 16 million children under 5 years of age, which means about 2 episodes of diarrhea annually for every child in this age category. The majority of these episodes are mild or easy forms of disease. In developing countries the number of diarrhea episodes are about 2 -3 times bigger than in the U.S.A, which means that a child under 5 years of age has 4 -6 episodes of diarrhea annually. (1)

## OBJECTIVE

Because in developing countries acute enterocolitis remains a main cause of mortality and morbidity in childhood I considered that is necessary a study which has as one of the objectives to find the incidence/prevalence of the bacterial enterocolitis in a selected category of children (globally and on age groups – 0-1 year, 1-3 years, 3-5 years and over 5 years of age).

## MATERIAL AND METHOD

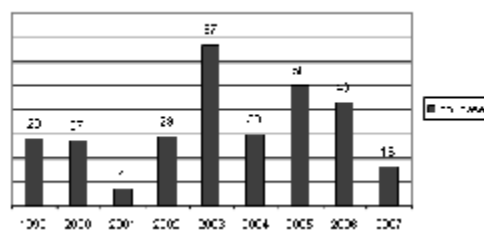
As material and method I used the stool cultures registry from the laboratory of the Pediatric Clinic of Sibiu ( which contains the stool cultures of the children from Clinic and of the children from the infectious diseases department), from 1999 – 2007 and the medical papers of the patients with positives stool cultures, in the same period of time.

## RESULTS

After the analysis of the stool cultures registries I found 297 positives stool cultures for bacterial intestinal pathogens: Salmonella (164), Shigella (103), Yersinia enterocolitica (19), EPEC (9), EIEC (1) and Plesiomonas shigelloides (1). The distribution by years of the cases with positive stool cultures was presented in figure 1

It is observed that the annual distribution of the cases with bacterial enterocolitis is between 16 and 30 cases by year, with the exception of year 2001 (with only 7 cases) and with the peaks in 2003 with 57 cases, 2005 with 50 cases and 2006 with 43 cases. The distribution by months of the cases with positive stool cultures is like in the figure no 2.

Figure no. 1. Distribution by years of cases with positive stool cultures



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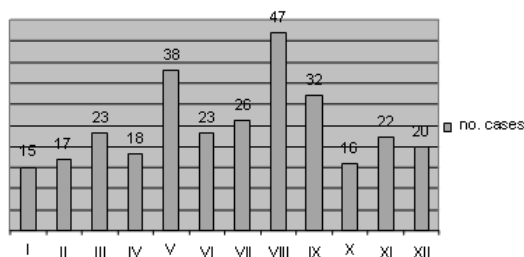
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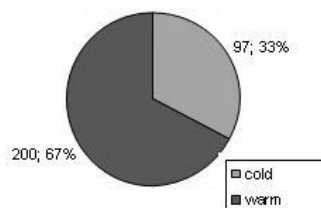
## CLINICAL ASPECTS

It was observed two peaks of frequency in May, with 38 cases and in August with 47 cases, which represents 12,8 % and 15,8 % from the cases. The lowest frequency was in January with 15 cases (5 %) and October with 16 cases (5,4 %). The repartition of cases by season ( the cold season is between November and March and the warm one between April and October) was presented in figure no 3.

**Figure no. 2. Distribution by months of the cases with positive stool cultures**



**Figure no. 3. Distribution according to season of the cases with positive stool cultures**



### DISCUSSIONS

From these findings it is observed that the most frequent bacterial pathogens of enterocolitis at children hospitalized in the Pediatric Clinic of Sibiu and in the children infectious diseases department, between 1999-2007 are *Salmonella* and *Shigella*. This findings are in concordance with dates from medical literature, where many studies show that *Salmonella* and *Shigella* are the main bacterial causes of enterocolitis at pediatric patients.(7) A study made in the U.S.A at the Cincinnati Children Hospital Medical Centre, in 2003, based on 2884 stool cultures, proved that the most important bacterial pathogens are *Salmonella* (about 50%), *Shigella* (about 40%), followed by *Campylobacter*, a bacteria which is very difficult to be identified in most laboratories from developing countries.(7) *Salmonella* causes about 1-5 millions diarrhea episodes at child in the U.S.A. The infants have the highest risk for disease and the frequency is reduced over 6 years of age. (4, 6) The *Shigella* infection occurs globally and is most frequent in warm climates and rain season in tropical countries. It appears equally at both sexes and can occur at any age, but especially at children between 2 - 3 years of age. The infection in the first 6 months of life is rare, probably because of the absence of the receptors for shiga toxin.(1, 2, 4, 7) *Yersinia* was initially thought to occur with greater frequency in countries with cooler climates but now is recognized to be worldwide in distribution. It has an incidence of one case (proved by positive stool culture) at 100000 people annually in the U.S.A and a little higher in North Europe. The disease is more frequent in cold season at young males. In childhood the majority of infections occur under 7 years of age, especially under 1 year of age. The most frequent serotypes in Europe and Japan are O3 and O9 and in the U.S.A and Canada O8. The study made at the Cincinnati

Children Hospital Medical Centre, in 2003 showed *Yersinia* on the sixth position as a bacterial pathogen in enterocolitis, after *Salmonella*, *Shigella*, *Campylobacter*, *SPEC* and *Aeromonas* (the identification of the last 3 pathogens is very difficult and is made only in advanced laboratories). The positive stool cultures for *Yersinia* represented about 6% from the 2884 stool cultures included in this study. Another studies affirmed that *Yersinia* causes about 1,4 - 2,8% from the cases of infectious diarrhea in child.(1, 2, 7) From the 297 positive stool cultures in my study, *Yersinia* represents about 6,40%, an important percent if we think that *Yersinia* is a pathogen difficult to be identified, especially in developing countries. A study from 1972, made by Rusu, based on 10000 stool cultures, identified only 19 positive stool cultures for *Yersinia*. (5) EPEC represents only 3% from the stool cultures. It may be explained because is hard to be identified. In developing countries EPEC causes about 30-40% from diarrhea episodes, especially under 6 months of age.(3) The distribution of the cases by season is concordant with dates from medical literature which suggests that the incidence of bacterial enterocolitis rises in warm season (from 5-10% from infectious diarrhea episodes under 3 years of age in the U.S.A and Canada to 20%). (1, 2, 7)

### CONCLUSIONS

Following the results we reached the following conclusions: *Shigella* and *Salmonella* are the most frequent bacteria involved in bacterial etiology of enterocolitis in child. *Yersinia enterocolitica* comes on the third place as frequency (6.40%). The percentage in this case could be greater if it would pay more attention to discovering the germ, given the difficulty of isolation. EPEC also should be considered as possible etiologic agents of enterocolitis in infants under 6 months of age (especially under 3 months), given the low percentage of cases detected (3%), in disagreement with the literature, which is credited as a major pathogen in developing countries, in infants under 6 months of age.

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