

Enteroaggregative *Escherichia coli* Diarrhea in Manipal

Diarrheal diseases are a major cause of illness in many parts of the world particularly affecting infants and children leading to a high degree of morbidity and mortality, which contributes to the death of 3.3 to 6 million children annually. Detection of the etiological agents of diarrhea is important for therapeutic aspects and for implementing appropriate control strategies.

In developing countries, the bacterial pathogens most commonly associated with endemic form of diarrhea is diarrheagenic *Escherichia coli* [DEC]. Diarrheagenic *Escherichia coli* belongs to different categories of pathotypes, which are classified based on their distinct clinical features, virulence mechanisms and serotypes. Currently, 5 distinct pathotypes of DEC are recognized: ETEC, EPEC, EaggEC, EHEC and EIEC(1).

Accordingly, a prospective study of acute and persistent diarrhea was carried out in a cohort of children in a rural place located in the coastal belt of Karnataka, South India from May 2001-June 2003.

One hundred and sixty eight children aged between 0-5 years admitted to the Pediatric ward of Kasturba Medical College Hospital, Manipal with watery diarrhea for more than 2 weeks, abdominal cramps with or without fever were included for the study. Seventy-five age-matched infants and children without diarrhea during the last 3 weeks served as controls. Three *Escherichia coli* colonies per specimen were further characterized by pathotype specific virulence gene targeted PCR assays. A multiplex PCR assay was applied for the detection of Eagg *E. coli*

[Eagg, ast], ETEC[elt, est], EPEC[eae,bfpA] genes at NICED, Kolkata.

The other enteric pathogens were identified using recommended standard procedure(2). Detection of Rotavirus antigen [Mercia Diagnostics Ltd, England] and demonstration of *Cryptosporidium* and *Isospora* was done by modified Z-N staining and Immunofluorescence technique(3).

A total of 82 (48.8%) Enteric pathogens were isolated from acute diarrhea (Table I). Bacterial isolates were highest (71.93%) where Eagg *E. coli* predominated (21.95%). Age wise analysis showed that Eagg *E. coli* and *Aeromonas* diarrhea was common between 13-24 months of age and that of Rotaviral diarrhea was seen in 7-12 months age. To determine how well the various pathogens correlate with diarrhea, age-matched controls were used. Enteroaggregative *E. coli* was seldom isolated from control group.

Eagg *E. coli* was the most common cause of diarrhea in children below 5 years of age followed by Rotavirus. The strains of *S. typhimurium* and *Shigella* were found to be multiple drug resistant strains. With the benefit of experiences from other workers, it is suggested to use fluoroquinolones in neonatal diarrhea in instances of proven infection with MDR strains(4).

In the present study, Eagg *E. coli* was the commonest isolate from infantile diarrhea and their isolation from children below 2 years correlates well with studies elsewhere(5). In 21.95% of the patients from whom Eagg *E. coli* were isolated, it was the sole pathogen recovered. The incrimination of Eagg *E. coli* as a cause of persistent diarrhea in developing countries is an interesting and potentially important observation over here in a rural cohort area of South India.

TABLE I—The Different Enteric Pathogens Isolated from Children Below 5 Years of Age

Etiological agents	No of pathogens		Controls [n = 75]	
	No	%	No	%
Bacterial				
EPEC	4	4.87	—	—
ETEC	6	7.32	—	—
EaggEC	18	21.95	—	—
<i>Salmonella typhimurium</i>	11	13.41	2	2.66
Shigella spp	8	9.76	—	—
<i>Vibrio cholerae</i>	2	2.43	—	—
<i>Aeromonas hydrophila</i>	8	9.76	3	4
<i>Chromobacterium violaceum</i>	2	2.43	—	—
Parasitic				
Cryptosporidium	4	4.87	1	1.33
Viral				
Rotavirus	16	19.51	3	4
Fungal				
<i>Candida albicans</i>	2	2.43	—	—

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Mamatha Ballal, Ramamurthy T.,
Departments of Microbiology,
KMC, Manipal, Karnataka, India
and
National Institute of Communicable
Diseases, Kolkata,
India

Correspondence to:

Dr. Mamatha Ballal,
Additional Professor of Microbiology,
KMC, Manipal 576 104, Karnataka,
India.

E-mail: Mamatha_98@Yahoo.Com

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