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Faecal leucocytes in bacterial diarrhoea of infants

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Fecal samples of 50 infants having diarrhoea and 25 controls were examined microscopically for the presence of fecal leucocytes. Number of fecal leucocytes was 21-23/HPF in patients from whom shigellae or salmonellae were isolated, and 1-2/ HPF in patients from whom Enteropathogenic, Enterototoxigenic Escherichia coli or ova/cysts of parasites were recovered. This simple bed side investigation can be a useful tool in differentiating between invasive or enterotoxigenic diarrhoea in infants.

Key wards : Bacterial diarrhoea, Fecal leucocytes

Toxigenic and invasive mechanisms have been implicated as process by which bacteria produce diarrhoeal disease[1]. To ascertain the toxigenicty or invasive property of the offending bacteria is time consuming and laborious. Moreover facilities for these investigations are not available at all the centres in developing countries. In certain situations it becomes important to decide immediately about the antibiotic therapy. As depending upon the host, invasive diarrhoea needs to be treated with antibiotics.

The present investigation describes the association of fecal Leucocytes in diarrhoeal disease of bacterial etiology.

Material and Methods

Fecal samples were collected from 50 infants having acuts diarrhoeal disease and 25 age matched controls (with no history of diarrhoea during past 2 months). These infants attended pediatric emergency department of Nehru hospital of post graduate Institute of Medical Education and Research Chandigarh, during the period of May 1979-Aug 1979. The fecal samples were processed for enteropathogenic bacteria. The cover slip preparations of the feces mixed with a drop of Loffler's Mythylene blue were examined microscopically for presence of fecal lucocytes. Three such preparations were examined and at least 50 high powerfields were checked for presences of leucocytes. Results were expressed as mean $\pm$ SD/HPF of three preparations. Unstained cover slip preperations were also checked for presence of ova or cysts of parasites.

Enterotoxigenicity of *Esch. coli* strains was checked by Co-agglutination test[4] and infant mouse test[5]. Serotyping of *Esch. coli* was done by using polyvalent A, B, C, D, E and their monovalent antisera received from Difco Laboratories, U. S. A.

Results

Enteropathogens could be demonstrated

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in the fecal samples of 41 (82 percent) of the infants having diarrhoca while 3 (6 percent) of the controls also showed presence of enteropathogens (Table-1). The isolated enteropathogenic serotypes of *Esch. coli* (018, 026, 0119, 0127) were non enterotoxigenic. While the strains not belonging to enteropathogenic serotypes were enteroxigenic (LT + & LT + ,5; LT+,13;ST+,2).

Higher number of fecal leucocytes was observed in the fecal samples of infants with shigella or salmonella diarrhea as compared to the fecal samples from which enteropathogenic or enterotoxigenic *Esch.coli* were isolated (Table-11). There was no significant difference between number of fecal leucocytes present in the faeces of infants having diarrhoea due to Enteropathogenic, Enterotoxigenic *Esch. coli* & from whom no enteropathogen could be recovered.

Table 1. Entoropathogens Isolated from Focal Samples of 50 Infants Having Diarrhea and 25 Controls

Enteropathogens	Diarrhea group	Control group
Enteropathogenic E. coli	14	2
Enterotoxigenic E. coli	20	—
Salmonella typhimurium	2	—
Salmonella barielly	1	—
Shigella flexnari type 3	1	—
Shigella dysenteriae type 1	1	—
Gardia lamblia	1	—
Ascaris lumbericoids	1	1
Total	41	3

Table II—Fecal Leucocytes (Mean±SE/HPF) in Fecal Samples of Infants having Diarrhea and in Controls.

Enteropathogens	No. of leucocytes Mean ± SD/HPF
Shigella	21±12.7
Samonella	23.3±11.3
EPEC	1.7± 2.4
ETEC	1.5±2.5
Parasites	1.4±2.5
No bacterial pathogens	1.3±2.2
Controls	1.2±2.4

EPEC — Enteropathogenic E. coli, ETEC — Enterotoxigenic E. coli

Discussion

Association of fecal leucocytes with invasive diarrhea have been shown by various investigators[3,6,7] Harries et. al[8] showed presence of leucocytes in 100 percent of cases of shigellosis and invasive *Each. coli* diarrhea. In Salmonella diarrhoea 81 percent of the patients had fecal leucocytes, where as in non specific diarrhea only 9 percent of the patients showed the presence of fecal leucocytes. Number of leucocytes in fecal samples of patients having shigellosis or salmonellosis was 30-40/HPF while in non specific diarrhea it was 1-3/HPF. In another investigation, fecal leucocytes could be demonstrated in 85 percent and 36 percent of the patients having shigellosis and salmonellosis respectively. In the present investigation infants from whom shigellae or Salmonellae were isolated showed significantly higher ($P<0.001$) number of fecal leucocytes as compared to cases from whom *Enteropathogenic* or *Enter-*

oxigenic Esch. coli or no bacterial pathogens could be isolated In our previous experience also the Enteropathogenic serotypes of *Esch. coli* were non enterotoxigenic.

Examination of leucocytes in the fecal samples of infants having diarrhea is a very simple bed side investigation which can form a guideline about the nature of diarrhea and to decide about the antibiotic threapy.

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Pertussis vaccine research

Bordetella pertussia infects only man, via the respiratory route, usually from patients with catarrhal symptoms. The host parasite interactions are not well understood. The first step in infection is the attachment of the organism to target cells, probably through filamentous hemagglutinins. Next the organism produces a local infection. Dermonecrotic toxin and lymphocytosis promoting factor are produced, as also a peptide called tracheal cytotoxin; and a polymorphonuclear leukocyte inhibitory factor (PIF). The systemic disease is produced by the metabolities as the organism itself is noninvasive.

The use of hyperimmune globulin or antibody in pertissis prophylaxis has wide acceptance, but there is no evidence of efficacy in well controlled trials. The current whole cell pertussis vaccine was developed defore the recent advances in immunology. Therefore the development of a purified, definitive immunogen for pertussis is highly desirable, though not yet in sight. Efforts are needed to improve currently available whole cell vaccines.

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