Aetiology of Gastroenteritis in Infancy and Early Childhood in Rawalpindi and Islamabad Area

Pages with reference to book, From 201 To 203

Mohammad Mubashir Ahmed Khan, Abdul Ghafoor, M.I. Burney (PMRC Central Research Centre, National Institute of Health. Islamabad.)

Abstract

A bacteriological study was done on the stool of 240 infants and young children. Ninety nine (41 2%) cases were found to be positive for causative agents of gastroenteritis.
Stool cultures were positive for bacteria in 40% and for parasite in 1.3% patients.
Thirty per cent of the cases had enteropathogenic E. coli (EPEC), followed by Proteus morganii (4-7%), Shigella (2.0%), Salmonella (1-6%), Pseudomonas aeruginosa (1.6%).
Giardia intestinalis was found in 1.3% of cases.
Bacteriological agents were observed in 45.6% of the cases upto the age of one year and 35.3% above one year (JPMA 31:201, 1981).

Introduction

Acute diarrhoeal disease is a leading cause of morbidity and mortality in infants and children in most of the developing countries includiug Pakistan.
Most commonly known bacterial agents responsible for gastroenteritis belong to genus Salmonella., Shigella, Escherichia (Enteropathogenic strains), Proteus and Pseudomonas. Among the viruses enteroviruses, adenoviruses, reoviru-ses, rotaviruses and norwalk viruses are the main agents.
The present study was undertaken to and determine bacterial spectrum involved in the gastroenteritis in children under 5 years of age with main emphasis on the presence of enteropathogenic bacteria.

Material and Methods

During the summer of the year 1979 stool samples from cases of gastroenteritis were collected from the paediatric department of Central Government Hospital Rawalpndi and Central Government Polyclinic Islamabad and processed at PMRC Central Research Centre, National Institute of Health, Islamabad.
Stool samples were taken in all the cases in Cary and Blair transport medium (CBTM) for culture and also in a clean container for microscopy. Single specimen examination was usually carried out in each case.
Samples were examined for intestinal parasites in saline and iodine preparations.
Approximately one gram of stool either from CBTM tube or container was emulsified in 5 ml peptone water. One loopfull was inoculated for primary culture on MacConkey agar (MA), desoxycholate citrate agar (DCA), Bile salt agar (BSA) and Thiosulphate citrate bile salt sucrose agar (TCBH).
Enrichment was done by transfering one or two loopfull from peptone water emulsion to Selenite-' F broth and alkaline peoptone water (PH-8.6) and after overnight incubation at 37°C plated on DCA from the former and on TCBS from the latter.
From each MacConkey agar plate 10-15 lactose fermenting colonies were examined for EPEC.
Identification of the different bacteria was carried out using a battery of biochemical tests and serotyping.

Results

Out of 240 cases 40 percent were found to be positive for bacterial pathogens while only three cases (1.3%) revealed the parasitic agent i.e. Giardia intestinalis. The remaining 58.8 parcent revealed no atiological agents.

Bacteria belonging to 8 species were isolated from 96 (40%) cases on the basis of their known enteropathogenicity and pure growth on the primary culture (Table I).

Table I

Causative Organisms of Gastroenteritis

Organisms	*No. Isolated*
E. Coli (EPEC) OK Poly A	29 (12.1%)
OK Poly B	36 (15%)
OK Poly C	7 (2.9%)
Proteus Morganii	11 (4.7%)
Shigella Boydii	2 (0.8%)
Shigella Flexeneri	2 (0.8%)
Shigella Dysenteriae	1 (0.4%)
Pseudomonas Aeruginosa	4 (1.6%)
Salmonella Stanley	2 (0.8%)
Salmonella Typhi	2 (0.8%)
Giardia Intestinalis	3 (1.3%)
Negative	41 (58.8%)
Total:	240

The bacterial infection were higher in the children upto 1 year of age of followed by age group 1-3 year

and 3-5 years. In all age groups EPEC was the main pathogen, followed by Proteus morganii and Pseudomonas aeruginosa' Shiegella boydii was isolated only from the cases of 1 year of age (Table II).

Table II

Distribution of Organisms According to Age.

Organisms	0-1 *Year*	1-3 *Years*	3-5 *Years*
E. Coli (EPEC) Ok Poly A	19 (13.8%)	8 (10.7%)	2 (.4%)
Ok Poly B	25 (18.1%)	9 (12%)	2 (7.4%)
Ok Poly C	5 (3.6%)	2 (2.7%)	—
Proteus Morganii	7 (5 1%)	2 (2.7%)	2 (7.4%)
Shigella Boyd II	2 (1.5%)	—	—
Shigella Flexener I	1 (0.7%)	1 (1.3%)	—
Shigella Dysenteriae	—	1 (1.3%)	—
Pseudomonas Aeruginosa	3 (2 .%)	1 (1.3%)	—
Salmonella Stanley	1 (0.7%)	1 (1.3%)	—
Salmonella Typh	—	1 (1.3%)	1 (3.7%)
Giardia Intestinalis	—	—	3 (11 1%)
Negative	75 (54.3%)	49 (65.4%)	17 (63%)
Total	138	75	27

In all age groups, males (Table II) suffered more from gastroenteritis than females. EPEC was found to be the main causative agent in both sexes of all age groups, while proteus morganii was found mainly in males of age group upto 1 year. Among Shigella species, Shigella boydii and Shigella dysenteriae were found in males while
Shigella flexenari was found in females. Pseudo-monas aseruginosa found was mainly in males. Salmonella typhi was found equally in both males and females while Salmonella Stanley was found in females only. Out of three cases of parasitic inestation two were females.

Discussion

The present study shows that diarrhoea in 40 percent of cases is caused by the bacterial pathogens as has previously been reported by Naidu (1964) and Erwa (1969). Fifty one percent cases of Sanyal et al (1977) and 66% of Maiya et al (1977) had bacterial gastroenteritis.
EPEC was found to be the main causative agent which cocincides with the studies of Sengupta and Sherma (1967), Nath et al (1973). Erwa (1969) and Sanyal et al (1977) recorded EPEC from 17 per cent of cases. Next Pathogen was Proteus morganii, while Salmonella and Shigella were isolated in low percentages which is in contrast with the studies of Lui et al (1967) who reported that Salmonella johansbura caused diarrhoea in 51 percent of his cases.
High frequency (17.4%) of Shigella species have been shown by Bhat et al (1971); it affected both

sexes equally in the age group 3-12 months. The most common species was S. flexeneri. A study from Iran by Mohadjer and Badalian (1969) also showed that 15.2 percent of the cases were due to Shigella species and frequency was more in age group of 1-2 years. In our study while out of five Shigella cases three were in males in the age group 0-1 year, Salmonella species was found more in females in the age group of 1-3 years.

EPEC mainly affected the male patients of 0-1 year age group which is similar with the results of Sanyal at al (1977).

The parasitic infectation was lower and caused gastric upset. Giardia Lamblia is a common pathogen in our urban population.

Bacterial agents are playing quite a major role in infantile gastroenteritis in this area and probably it is due to poor hygienic conditions. Mothers need to be educated on child health care and personal hygiene.

Acknowledgement

We are grateful to Dr. Mushtaq Ahmed Khan, Paediatrician, Central Government Polyclinic Islamabad for providing necessary help and advice.

References

1. Bhat, p., Myers, R.M and Jadhav, M. (1971) Shigella-associated diarrhseal disease in pre-school children. J. Trop. Med. Hyg., 74:128.
2. Erwa H.H. (1969) Bacteriology of diarrhoea in Sudanese children. J. Trop. Med. Hgy., 72:261.
3. Lui W.Y., Chang, W.K., Fok, T.F. and Tech-chan, C.H. (1979) Salmonella gastroenteritis in Hong Kong. A Clinical review of 200 patients. J. Trop. Med. Hyg., 82:53.
4. Maiya, P.p., Pereira, S.M., Mathan, M., Bhat, R., Albert, M.J. and Baker, S.J. (1977) Aetiology of acute gastroenteritis in infancy and early childhood in southern India. Arch. Dis. Child., 52:482.
5. Mohadjer, S. and Badalian, K. (1969) Studies of diarrhoeal diseases in Iran. I. Occurrence of bacterial infection in preschool children on the central plateaue of Iran. J. Trop. Med. Hyg., 72:265.
6. Naidu, L. (1964) Enterpathogenic escherichia coli serotypes from acute cases of diarrhoea in viskhapathnam. Indian J. Microbiol., 4:33.
7. Nath, P., Bajpai, p.C, Amanullah and Khan, A.M. (1973) Intestinal flora in cases of diarrhoea of infants and children. Indian J. Pathol Bact., 16:37.
8. Sanyal, S.C., Sen, p.C, Tiwari, I.C., Bhatia, B.D. and Singh, S.J. (1977) Microbial agents in stools of the infants and young children with and without acute diarrhoeal disease. J. Trop. Med. Hyg., 80:2.
9. Sengupta, S.R. and Sherma D.K. (1967) Bacteriology of diarrhoea in infants with special reference to enteropatho-genic coli. Indian J. Pathol. Bact., 10:304.