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The Prevalence and Pattern of Enteropathogenic E. Coli, Shigella and Salmonella among Infants and Young Children in the Etimesğut Rural Area

A Study of Cases between March and June, 1968

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Many writers have shown in their work the significance of enteropathogenic microorganisms to the health of infants and young children in all parts of the world.[1] [2] [3] [4] [5]

The purpose of this work is to find the pattern and types of enteropathogenic microorganisms prevalent among a sample of infants and young children from birth to six years of age in the Etimesğut rural area.

Materials and Methods

The group studied was an unselected sample of infants and young children attending the out-patient clinic in the Etimesğut Health Center.

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Every child with diarrheal symptoms, and every second child with other symptoms, was included in the study. For checking purposes a control group of healthy children was also examined in the village of Susuz in conjunction with the Etimesgut MCH Center study. Stool specimens were obtained by using rectal swabs which were immediately placed in tubes containing 5 ml of buffered glycerin preventive solution; these reached the laboratory within four hours to be cultured on MacConkey's Agar (Difco), SS Agar (Difco) and tetrathionate broth. After 24 hours' incubation, the petri dishes were examined, and if enteropathogenic E. coli colonies were suspected diagnostic agglutination tests were done. Also inoculations of suspected colonies were made into sugar media, and from tetrathionate broth into SS Agar and MacConkey, and the plates were examined after 24 hours' extra incubation. Suspected colonies were inoculated into fermentation tubes containing sugar and tryptone, remaining there for 24 hours; then agglutination was performed to ascertain the types of shigella and salmonella. Isolation and identification of salmonella and shigella were made by picking up suspected colonies and studying their biochemical characteristics and conducting serological studies.

Results

Out of 100 patients examined in the Etimesgut Health Unit, five were found to be affected with enteropathogenic E. coli, an incidence of five per cent. The total number of diarrheal cases in 100 patients was 6.2 per cent, but only one of these was affected with enteropathogenic E. coli. Eighty-four patients had other symptoms, most of which were upper respiratory system infections, showing an incidence of 4.7 per cent.

Out of the 125 healthy children examined in the village of Susuz, four were found to be affected with enteropathogenic E. coli and one with Shigella flexneri, an incidence of 3.2 per cent and 0.8 per cent respectively.

Table I shows the total number of infants and young children by the type and pattern of enteropathogenic microorganisms detected in this study (100 children in Etimesgut and 125 in the Susuz control group).

Discussion

The incidence of enteropathogenic E. coli throughout the year, in the absence of epidemics, would indicate that sporadic cases of infection due to some member of this group of microorganisms occur, as is the

TABLE I

TOTAL NUMBER OF INFANTS AND YOUNG CHILDREN BY THE TYPE AND PATTERN OF ENTEROPATHOGENIC MICROORGANISMS

	Name	Age	Sex	Diarrhea	Type of Etp. E. Coli		Percentage
Etimesğut	N.E.	1 year	F	—	0111:B4		
	D.G.	25 days	F	+	0111:B4	3%	
	F.N.	20 days	F	—	0111:B4		
	E.S.	10 months	M	—	0119:B14		5%
	I.A.	26 days	M	—	0119:B14	2%	
Susuz	A.M.A.	2 years	F	—	0119:B14		
	H.A.	2 months	F	—	0119:B14	1.6%	
	A.K.S.	5 months	M	—	0-25:Hb	0.8%	3.2%
	N.M.I.	2 years	F	—	0125:B12	0.8%	
	S.M.Z.	1.5 years	F	—	Shigella flexneri	0.8%	

case with the Shigella and salmonella groups. Similarly, the fact that some infants from whom E. coli has been isolated have had only slight diarrhea, and thus are only moderatelly ill, suggests that this group of microorganisms may cause mild sporadic infections. These latter patients, together with a small percentage who remained convalescent carriers, are potential sources of infection. The results show that among the group of 225 children studied, not one had salmonella infection.

Graber and Dunlop[7] showed in their report that there were no enteropathogenic E. coli isolations from non-diarrheal patients. Cooper, Keller and Walter[8] showed the incidence of diarrhea in the Shigella group to be 98 per cent, and in patients with enteropathogenic E. coli 92 per cent.

Hardy and Watt[9] reported the incidence of Shigella. Of 175 diarrheal cases examined culturally, 114 (65 per cent) were positive, and of 199 healthy contacts of known positive cases, 37 (19 per cent) were found to be carriers. They also reported[10] that the Shigella carrier case ratio correlates markedly with age, being low in children under five years of age and without disease (0.8 per cent), and progressively increasing with age. It was higher, and without significant variations, in older children and adults (2.6 per cent).

Our own recent study, however, showed 3.2 per cent to be affected with enteropathogenic E. coli and 0.8 per cent with Shigella. Among nine patients with enteropathogenic E. coli, only one had diarrhea (11.1 per cent). This study was conducted during the spring, and the number of cases increases during the summer.

Summary

The incidence of enteropathogenic E. coli was found to be five per cent of 100 children studied at the Etimesğut out-patient clinic. The incidence of enteropathogenic E. coli and Shigella was found to be 3.2 per cent and 0.8 per cent respectively among the 125 healthy children examined in Susuz.

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