CAMPYLOBACTER JEJUNI AS A CAUSE OF DIARRHOEA

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ABSTRACT

This study was carried out to isolate and identify *Campylobacter jejuni* from stool samples of patients suffering from diarrhoea. The study spanned a two-year period and *C. jejuni* was isolated in 10 (4.5%) out of 220 patients of diarrhoeal disorders. In samples of stool collected from 50 healthy individuals, *C. jejuni* was isolated in one (2%) case. Further, to isolate other enteropathogens alongwith *C. jejuni*, procedures were undertaken simultaneously to identify *Salmonella*, *Shigella* and *Vibrio cholerae* infection. *Salmonella* sp was isolated in 8 (3.6%), *Shigella* sp in 4 (1.8%) and *Vibrio cholerae* in 10 (4.5%) cases out of 220 faecal cultures studied. In one stool specimen *Shigella flexneri* was isolated alongwith *C. jejuni*.

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KEYWORDS: *Campylobacter jejuni*; Diarrhoea; Enteric pathogens.

Introduction

Diarrhoeal disorders are important cause of morbidity and mortality in most of the developing countries. World statistics also documents the pre-eminent position of diarrhoea as a killer of infants and children. In developed countries diarrhoea is the fifth commonest cause of death [1].

In the past decades there have been many reports all over the world of newer pathogens causing diarrhoeal disease in man. Among these newer pathogens, *C. fetus* sub sp *jejuni* has been recognized as an important pathogen causing subacute or acute gastroenteritis in man. Australia, Canada, Netherland, Sweden, UK and USA have reported isolation of *C. jejuni* from 5-14 per cent cases of diarrhoea and 1 per cent of asymptomatic patients [2]. In several parts of the world the isolation of *C. jejuni* from diarrhoeal patients has transcended that of common enteropathogens like *Salmonella* and *Shigella* especially in developed countries [3]. In UK, 9500 strains of *C. jejuni* were isolated in 1981 in patients with diarrhoea. This exceeded numbers of *Salmonella* and *Shigella* isolated [4]

The present study was carried out to isolate and

identify *C. jejuni* as a causative organism in cases of diarrhoea and find out its occurrence in the population in and around Pune.

Material and Methods

The material of this study consisted of 220 cases of diarrhoea attending either as outpatient or admitted in various wards of Command Hospital (SC), Cantonment General Hospital and Infectious Diseases Hospital, Pune. Fifty apparently healthy persons with no history of diarrhoeal illness were selected as controls. Detailed clinical history of duration of illness, frequency of stool, and of antibiotic administration was recorded. Stool or rectal swabs were collected in modified Cary-Blair media.

Primary isolation of *C. jejuni* was carried out by plating out on Butzler's medium containing antibiotic supplements and incubated at 42°C in microaerophilic condition using candle jar for 72 hours [5]. The identification of *C. jejuni* was done based on typical colonial morphology, microscopic appearance and motility of the organism. Positive catalase and oxidase tests, hydrolysis of sodium hippurate, sensitivity to nalidixic acid and resistance to cephalothin confirmed the diagnosis

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of *C. jejuni* [6].

Isolation of other enteric pathogens e.g. *Salmonella* sp, *Shigella* sp, and *Vibrio cholerae* was also carried out simultaneously using MacConkey agar, desoxycholate citrate agar and thiosulphate citrate bile salt sucrose agar as culture media. Suspected colonies were subjected to biochemical tests and subsequently confirmed by slide agglutination with specific antisera.

Results

The age and sex distribution of 220 patients with diarrhoea and 50 healthy controls is shown in Table 1. It is apparent that 136 (61.8%) out of 220 samples of stool were obtained from children below 10 years of age. One hundred and twenty seven (57.7%) out of 220 stool samples were from male patients of various age groups. Twenty nine out of 50 samples of stool collected from healthy controls were below the age of 10 years and 31 out of 50 healthy controls were males. The age and sex of controls were not matched.

C. jejuni was isolated in 10 (4.5%) patients and

1 (2%) healthy control. The age and sex distribution of *C. jejuni* in cases and controls is shown in Table 2. Out of 10 patients excreting *C. jejuni* 8 were children below 10 years and 6 of whom were below 5 years of age. Two isolates were from adults between 11-30 years and no isolate was obtained from patients above the age of 30 years.

Out of 10 cases of diarrhoea excreting *C. jejuni*, 7 (70%) were males and 3 (30%) were female patients. One healthy male control was found excreting *C. jejuni*.

Isolation of enteric pathogens other than *C. jejuni* from 220 faecal samples revealed *Salmonella* sp in 8 (3.6%), *Shigella* sp in 4 (1.8%) and *Vibrio cholerae* in 10 (4.5%). No enteropathogen was isolated from stools of 50 healthy controls. In one patient *Shigella flexneri* was also isolated along with *C. jejuni*. Monthwise distribution of *C. jejuni* isolation from 220 patients showed that all the 10 cases were isolated between April to October (Table 3). In specimen of stools obtained from 50 healthy controls *C. jejuni* was isolated in 1 case

TABLE 1
Age and sex distribution in cases of diarrhoea and healthy controls

Subjects	No of stool	Sex	Age in years								Total	Mean	SD
			<1	1-5	6-10	11-20	21-30	31-40	41-50	>50			
Patient with diarrhoea	220	M	21	36	17	17	19	4	6	7	127	15.875	9.7567
		F	15	30	17	11	4	5	4	7	93	11.62	8.2858
Total			36	66	34	28	23	9	10	14	220		
Healthy controls	50	M	1	17	3	5	1	2	1	1	31	3.875	5.1341
		F	0	4	4	4	2	5	0	0	19	2.375	1.9961
Total			1	21	7	9	3	7	1	1	50		

TABLE 2
Age and sex distribution of *C. jejuni* in patients and controls

Source of stool samples	No of stool sample examined	No of samples in which <i>C. jejuni</i> isolated	Age and sex distribution of <i>C. jejuni</i> isolates											
			<1		1-5		6-10		11-20		21-30		>30 yrs	
			M	F	M	F	M	F	M	F	M	F	M	F
Patients with diarrhoea	220	10(4.5%)	1	1	2	2	2	0	1	0	1	0	Nil	
Healthy controls	50	1 (2%)	0	0	1	0	0	0	0	0	0	0	Nil	

TABLE 3
Month wise isolation of *C. jejuni* in patients of diarrhoea and controls

Sources of specimen		Month wise distribution of samples of stool examined											
		Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Patients with diarrhoea (220)	No of stool samples examined	12	10	25	20	29	20	14	31	11	21	10	17
	No of <i>C. jejuni</i> isolated	0	0	0	2	2	1	1	1	2	1	0	0
Healthy controls(50)	No of stool samples examined	0	0	0	5	12	5	7	2	5	2	12	0
	No of <i>C. jejuni</i> isolated	0	0	0	0	0	0	1	0	0	0	0	0

during the month of September.

Discussion

In the present study *C. jejuni* was found to be a causative agent in 10 (4.5%) cases of diarrhoeal disorder out of 220 patients of various age groups. In samples of stool obtained from 50 apparently healthy individuals *C. jejuni* was isolated in only 1 (2%) individuals.

Isolation of *C. jejuni* from diarrhoeal stool has been documented by various workers from different parts of the world. Butzler [7] reported *C. jejuni* from specimens of stool in 5.1 per cent cases in children suffering from diarrhoea and 1.3 per cent of healthy children. Pearson et al [8] documented isolation in 4.2 per cent cases and 1 strain of *C. jejuni* was isolated in 120 samples of stool from healthy controls. Pia et al [10] reported isolation of *C. jejuni* in 4.3 per cent children in Canada and none from 176 healthy controls. Martin et al [4] in their study of patients of all age groups with diarrhoea reported 5 per cent isolation rate of *C. jejuni* however they could not isolate *C. jejuni* from stools obtained from healthy controls. Studies of similar nature from India compare well with our present study. Devi et al [11] found *C. jejuni* in 5.9 per cent of children with diarrhoea in Trivandrum. Whereas Nath et al [12] isolated the organism in 4 per cent children with diarrhoea in Varanasi. Nair et al [13] isolated *C. jejuni* in 7.7 per cent cases with diarrhoea. Koulla-Shiro et al [26] in a study of childhood diarrhoea in Yaounde (Cameroon) also isolated *C. jejuni* in 7.7 per cent of 272 patients with diarrhoea, and in 3.2 per cent of healthy controls. In one-year study of Campylobacter enteritis in Singapore, Lim and Tay [27]

recovered *C. jejuni* in only 1.2 per cent of diarrhoeal stool. Three per cent of the isolates were from children below 5 years of age. Khadkikar and Panjarathinam [28] found prevalence rate of *C. jejuni* in 2.5 per cent children suffering from acute diarrhoea in a study conducted at Ahmedabad.

The higher isolation rate of *C. jejuni* (10-16%) in cases of diarrhoea has also been reported by other workers from various parts of the world (14-19). Much higher isolation rate of *C. jejuni* have been documented in cases of gastro-enteritis. Menzing [20] isolated *C. jejuni* in faecal samples of 221 out of 263 cases of gastroenteritis. Wright et al [21] isolated *C. jejuni* in 12 out of 25 cases of milk borne gastroenteritis. Bichile et al [29] in a 2-year study in Mumbai isolated *C. jejuni* on stool culture in 11 per cent patients suffering from acute enteritis or gastroenteritis. The higher isolation rate of *C. jejuni* could be due to low socio-economic status, poor personal hygiene and surroundings of live stock e.g., cattle, chicken and sheep.

The involvement of younger age group of patients with diarrhoea has been reported by most of the authors from India and abroad [11-18,22-24]. Similarly the distribution of patients suffering from diarrhoea due to *C. jejuni* showed male preponderance in most of the studies.

There has been wide variation in the isolation rate of other enteric pathogens isolated along with *C. jejuni* in patients with diarrhoea. In our study isolation of *Salmonella*, *Shigella* and *Vibrio* sp was 3.6, 1.8, and 4.5 per cent respectively which is in agreement with other studies [8,10,14,18,22,25,27]. In an outbreak of cholera in Calcutta [17], *C. jejuni* was isolated in 10 out of 74 diarrhoea cases. Out of these 10 cases, 2 revealed *C. jejuni* as the sole pathogen and 8 cases were

associated with *V. cholerae*, *V. parahaemolyticus*, *A. hydrophilia* or *A. dispar*.

In conclusion, the result of the present study establishes *C. jejuni* as a common causative agent of diarrhoea in humans. However, it is yet to be recognised as a common enteropathogen due to lack of its growth on routine culture media. There is need to search for *C. jejuni* routinely in faecal specimens from patients with diarrhoea since it is not possible to diagnose campylobacter enteritis entirely on clinical suspicion.

REFERENCES

1. Health care and problems of young child in developing country-ecological context. Bull WHO 1979; 57: 387-403.
2. Enteric infections due to *Campylobacter*, *Yersinia*, and *Shigella*. Bull WHO 1980; 58: 519-37.
3. Epidemiology of *Campylobacteriosis* in developing countries. Bull ICMR 1984; 14: 79-83.
4. Martin J Blaser, Berkowitz ID, Laforce PM, Gravens J, Reller LB, Wang WL. *Campylobacter enteritis*: Clinical and epidemiological features. Ann Int Med 1979; 91: 179-85.
5. Lucchietfeld NW, Wang WLL, Blaser MJ, Reller LB. *Campylobacter fetus* subsp *jejuni*: back ground and laboratory diagnosis. Lab Med 1981; 12: 481-7.
6. Penner JL. *Campylobacter*, *Helicobacter* and related spiral bacteria. In: Balow A, Hauster WJ Jr, Herrmann KL, Isenberg HD, Shadomy HJ, editors. Manual of clinical Microbiology. Washington DC: American Society for Microbiology, 1991; 402-9.
7. Butzler JP. Related vibrios in Africa [Letter]. Lancet 1973; 2: 858.
8. Pearson AD, Suckling WG, Riccirdi ID, Knill M, Ware E. *Campylobacter* associated diarrhoea in Southampton [Letter]. BMJ 1977; 2: 955-6.
9. Tanner SI, Bullin CH. *Campylobacter enteritis* [Letter]. BMJ 1977; 2: 579.
10. Pai CH, Sorger S, Lackman L, Sinai RE, Marks ML. *Campylobacter gastroenteritis* in children. J Paediatr 1979; 94: 589-91.
11. Devi KI, Rajamma L, Sukumaran M. *Campylobacter* diarrhoea in children in Trivandrum. Indian J Paediatr 1989; 56: 657-60.
12. Nath B, Shukla BN, Reddy DC, Sanyal SC. A community study on the aetiology of childhood diarrhoea with special references to *Campylobacter jejuni* in a semiurban slum of Varanasi. Indian J Diarrhoeal Dis Res 1993; 11: 165-8.
13. Nair GB, Chowdury S, Bhattacharya SK, Pal SC. Occurrence and significance of *Campylobacter jejuni* in Calcutta. Ind J Med Res 1984; 80: 412-6.
14. Bruce D, Sochowski W, Ferguson IR. *Campylobacter enteritis* [Letter]. BMJ 1977; 2: 1219.
15. De Mol P, Bosmans E. *Campylobacter enteritis* in Central Africa [Letter]. Lancet 1978; 604.
16. Svedhem A, Kaijser B. *Campylobacter fetus* subspecies *jejuni*. A common cause of diarrhoea in Sweden. J Infect Dis 1980; 142: 353-9.
17. Chatterjee B. *Campylobacter enteritis* in Calcutta. A preliminary report. Indian Journal of Surgery 1981; 43: 117.
18. Olusanya O, Adebayo JG, Bolanie, Williams. *Campylobacter jejuni* as a bacterial cause of diarrhoea in Ilesha, Nigeria. J Hygiene (Cambridge) 1983; 91: 77-80.
19. Pazzaglia G, Podgore J, Bourgeois AL. Isolation of *Campylobacter jejuni* from patients with diarrhoea [Letter]. J Clin Microbiol 1984; 20: 835.
20. Mentzing LO. Water-borne outbreak of *Campylobacter enteritis* in Central Sweden. Lancet 1981; 2: 352-4.
21. Wright WD. Human vibriosis. Indigenous cases in England. BMJ 1967; 2: 283-7.
22. Brunton WAT, Heggia D. *Campylobacter* associated diarrhoea in Edinburgh [Letter]. BMJ 1977; 2: 956.
23. Skirrow MB. *Campylobacter enteritis*. A new disease. BMJ 1977; 2: 9-11.
24. Karmali MH, Fleming PC. *Campylobacter enteritis* in children. J Pediatr 1979; 94: 527-33.
25. Blaser MJ, Wells JG, Feldman RA, Follard RA, Allen JR. *Campylobacter enteritis* in the United States. Ann Intern Med 1983; 98: 360.
26. Koulla-Shiro S, Loe C, Ekoe T. Prevalence of *Campylobacter enteritis* in children from Yaounde (Cameroon). Cent Afr J Med 1995; 41: 91-4.
27. Lim YS, Tay L. A one year study of enteric *Campylobacter* infections in Singapore. J Trop Med Hyg 1992; 95: 119-23.
28. Khadkikar VS, Panjarathinam R. *Campylobacter enteritis* in Gujarat [Letter]. Indian J Pediatr 1993; 60: 471-2.
29. Bichile LS, Saraswati K, Popat UR, Nanivadekar SA, Deodhar LP. Acute *Campylobacter jejuni* enteritis in 385 hospitalized patients. J Assoc Physician India 1992; 40: 164-6.