

SHORT COMMUNICATION

ISOLATION OF *CAMPYLOBACTER JEJUNI* FROM DIARRHOEA PATIENTS IN EASTERN PROVINCE OF SAUDI ARABIA

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Abstract

Stool or rectal swab specimens from 607 patients attending the Diarrhoea Control Centre at Dammam, Saudi Arabia, were cultured for *Campylobacter jejuni* and some other bacterial enteric pathogens from July 1983 to January 1984. *C. jejuni* was isolated from 29 (5%) patients, isolation being highest among those aged under five. Other pathogens isolated were: *Shigella* 10%, non-typhi *Salmonella* 4%, and non-01 *Vibrio cholerae* 3%. Except for one mildly dehydrated patient, no other patients with *Campylobacter* showed clinical signs of dehydration on presentation. Of the 29 study patients, 55% complained of diffuse abdominal pain while another 25% had either macroscopically or microscopically evident blood in their stools. In 38% of patients, body temperature ranged from 37.1 to 37.7°C. Those studied were treated as outpatients, and were advised to take oral rehydration solution. Twelve of them (41%), who continued to have diarrhoea and passed bloody stools or had abdominal pain up to three days after their visit were given antibiotics. The observations of this study on the clinical severity and isolation rate of *C. jejuni* from patients with diarrhoea differ from findings of earlier studies done elsewhere in Saudi Arabia.

Key words: *Campylobacter jejuni*; Enteritis; Diarrhoea; Diagnosis; Laboratory.

Introduction

Since the first report in 1972 (1) of so-called "related vibrios" isolated by culture from the stools of patients with diarrhoea, *Campylobacter jejuni* has been increasingly recognized as an enteric pathogen. Butzler *et al.* (2) in 1973 and Skirrow (3) in 1977, developed, improved and simplified methods to isolate *C. jejuni* from the stools of patients with diarrhoea. *C. jejuni* is now recognized as a diarrhoea-causing pathogen, following the findings of several studies carried out in developed and developing countries. Researchers in Australia, Canada, the USA, the UK, Holland and Sweden have reported its isolation from 5-15% of diarrhoea patients, with a 31% *Campylobacter* isolation rate from infants aged 0-8 months with acute gastroenteritis, and a 38% rate from children aged 8-24 months (5). A study in Bangladesh found that *Campylobacter*-associated enteritis occurred in

14% of patients with diarrhoea, while *Campylobacter* was also isolated with a similar frequency from healthy people (6).

From Riyadh and Jeddah in Saudi Arabia, there have been recent reports of *Campylobacter*-caused enteritis (7-10). The only other report from Saudi Arabia's Eastern Province on *Campylobacter* isolation, done in 1982 by the ARAMCO Medical Department, detected three cases of *Campylobacter* bacteremia (11). The present study was conducted at the Diarrhoea Control Centre, Dammam, Eastern Province, Saudi Arabia, to examine the extent of enteritis caused by *C. jejuni* among diarrhoea patients. This appears to be the first comprehensive study on *C. jejuni* from the eastern region of Saudi Arabia.

Materials and methods

From July 1983 to January 1984, 607 patients with diarrhoea were examined for *Campylobacter jejuni*, as well as for other bacterial enteric pathogens. All patients visiting the Diarrhoea Control

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Centre's clinic during the study period were carefully examined and notes were kept on their illness. In each case, a stool specimen or rectal swab was cultured to isolate enteric pathogens. When stool was available, it was examined macroscopically for traces of blood and microscopically for red blood cells, white blood cells, macrophages, intestinal protozoa and helminths.

Patients were given appropriate rehydration depending on their degree of dehydration. Patients with no clinically apparent dehydration were advised to take the WHO-recommended oral rehydration salt (ORS) solutions at home. Antimicrobials were not given until proper bacteriological or microscopic confirmation of the presence of an enteric pathogen was made.

Stool specimens and rectal swabs were cultured and identified for *Shigella* spp., and *Salmonella* spp., using procedures described by Edwards and Ewing (12). For *Vibrio* spp., methods described by Cruickshank *et al.* (13) were followed. *Escherichia coli* were not sought.

To isolate *C. jejuni*, Campy BAP and medium made of *Brucella* agar (BBL Microbiology System, Cockeysville, Maryland), 5% sheep blood and freeze-dried *Campylobacter*-selective antibiotic supplement (Oxoid) containing five antibiotics (vancomycin, 10 mg/l; polymyxin B, 92,500 I.U./l; trimethoprim 5 g/l; amphotericin B, 2 mg/l; cephalothin, 15 mg/l) was used. This preparation was then streaked with stool samples or rectal swab specimens and the plates were incubated in a candle jar for 48 hours at 42°C. *Campylobacter* colonies were sought — those that were non-hemolytic, greyish, flat, wet, glossy and spreading; discrete entire colonies were also sought. Suspect colonies were tested for oxidase and catalase activity, for motility by a hanging-drop preparation, and for form and structure by microscopical examination after Gram staining. Using the methods

of Blaser (14), the following specific tests were done: growth at 25°C and 42°C, tolerance to 1% glycine and to 3.5% sodium chloride, H₂S production in Kligler iron medium, and sensitivity to discs containing 30 µg of nalidixic acid. Among those found infected with *C. jejuni*, 12 were given antibiotics because their diarrhoea had continued for more than three days after presentation at the clinic, and because they had bloody stools and/or abdominal pain. Of these patients, 5 received ampicillin, 5 erythromycin, 1 tetracycline followed by ampicillin, and 1 ampicillin followed by erythromycin. The last two received a second antibiotic when no clinical response was noted.

Results

Twenty-nine patients (4.8%) were found to be infected with *C. jejuni*, and the highest number of isolations (10%) was made from the under-five age group (11 of 110 patients). *C. jejuni* was isolated from only 4% of adults (Table I). Of the bacterial pathogens, *Shigella* spp. were isolated most frequently (16%) from older children and adolescents. Non-typhi *Salmonella* and *V. cholerae* non-01 were isolated from 4% and 3% of all patients respectively. *S. typhi* and *V. cholerae*-01 were not found.

Some clinical characteristics of the 29 infected *C. jejuni* out-patients on their first day of attendance at the clinic are shown in Table II. Eleven patients (38%) had fever, some of them having temperatures up to 37.7°C. Mild-to-moderate diffuse abdominal pain and tenderness, without rigidity, were seen in 16 patients (55%).

Stool specimens were collected from 24 of the 29 patients infected with *C. jejuni*. Macroscopic and microscopic findings from these specimens are shown in Table III.

TABLE I—AGE-SPECIFIC ISOLATION RATES (%) OF VARIOUS BACTERIAL ENTERIC PATHOGENS FROM DIARRHOEA PATIENTS AT DAMMAM (JULY 1983-JANUARY 1984)

Age-group (years)	Total patients	<i>C. jejuni</i>		<i>Shigella</i>		<i>Salmonella</i>		Non-01 <i>V. cholerae</i>	
		no.	%	no.	%	no.	%	no.	%
< 5	110	11	10	11	10	2	2	1	1
5-14	32	—	—	5	16	1	3	1	3
15+	465	18	4	42	9	21	4	15	3
All ages	607	29	5	58	9	24	4	17	3

TABLE II—CLINICAL FEATURES OF PATIENTS INFECTED WITH *C. JEJUNI*

Clinical features	No. of patients (%) (n = 29)
A. Duration of illness (hours) prior to attendance at clinic	
a) < 24	3 (10)
b) 24–72	12 (41)
c) 72–+	14 (48)
B. Fever (> 37°C)*	11 (38)
C. Abdominal pain	16 (55)
D. Vomiting	4 (14)
E. Dehydration	
a) Nil	28 (97)
b) Mild	1 (3)

* Range of temperature: 37.1°C–37.7°C

TABLE III – MACROSCOPIC AND MICROSCOPIC CHARACTERISTICS OF STOOL OF PATIENTS WITH *C. JEJUNI* INFECTION

Stool characteristics	No. of patients (%) (n = 24)
A. Macroscopic:	
a) Liquid/Loose	19 (79)
b) Soft	5 (21)
c) Bloody	4 (17)
B. Microscopic:	
a) R.B.C. (10–100 HPF)	6 (25)
b) W.B.C. (10–100 HPF)	11 (46)
C. Protozoa:	
a) <i>E. histolytica</i> (Troph)	1 (4)
b) <i>G. lamblia</i> (Troph)	1 (4)

Discussion

This study sought to ascertain the extent of *Campylobacter* enteritis in Saudi Arabia's Eastern Province. A community-based study was, however, not attempted. No seasonality was detected because the study period lasted only 7 months and occasionally *Campylobacter* culturing had to be suspended temporarily.

Only one of the 29 patients with *Campylobacter* enteritis presented with mild dehydration, though 48% of cases reported to the clinic 3–7 days after the onset of diarrhoea and had not been given any rehydration during their illness. The degree of dehydration seen in this work is dissimilar from those of a recent report of *Campylobacter* enteritis in children at Jeddah (10), in which a high percentage of patients required intravenous rehydration while about half were admitted to a hospital. Moreover, in that study, a high percentage of children had fever and had blood in their stools. In this present study, stools of only 25% of the cases contained blood. However, 46% of patients had fecal leukocytes in their stools, indicating the invasive nature of their diarrhoeal episode. The reason for such differences in the clinical severity of disease on presentation to a hospital between two regions of Saudi Arabia is unclear. Another discrepancy involved the rates of isolating *Campylobacter* from patients with diarrhoea -- higher (4.8%) in the current study than previous work done at Riyadh and Jeddah (7–8,10). This difference may be due to the varying inter-regional population characteristics, or to differences in the prevalent season of the study, and perhaps also to the improved isolation media and technique used in this work. Interestingly, in a recent study at the Riyadh Military Hospital, *C. jejuni* was isolated from 4.5% of a sample of patients with diarrhoea (9). In our study, the age-specific isolation rate for *Campylobacter* from diarrhoea patients was significantly higher from children aged less than five than from adults and older children (10% versus 4% and 0%). These findings are comparable to those of Bangladesh (6,15). Of the 29 study patients with *Campylobacter jejuni* only 4 (14%) had a mixed infection: one each had *Salmonella*, *Shigella*, *E. histolytica* and *G. lamblia*. In this respect the current observations differed from those of another Bangladeshi study (6), where 59% of patients with *Campylobacter*-associated diarrhoea harbored other intestinal pathogens as well. This difference may be due to sanitary, geographic, climatic and socioeconomic conditions which favor the occurrence of mixed infections in Bangladesh.

The isolates of *C. jejuni* were not tested for their sensitivity to erythromycin, usually considered to be the drug of choice to treat *Campylobacter* enteritis.

In this study, *Campylobacter*, with an isolation rate of 4.8%, was the second most frequently isolated bacterial pathogen in the study region at

that time. In contrast, reports from Riyadh (8) and Jeddah (10) placed *Campylobacter* as, respectively, the fourth and third most frequently isolated bacterial pathogen among diarrhoea cases.

The present study is indicative of the prevalence of *Campylobacter* enteritis in Saudi Arabia's Eastern Province. The diarrhoea caused by *Campylobacter* as observed in this study, was not as severe as that seen elsewhere in Saudi Arabia. Clinically, the resulting enteritis may be mild, and in most cases may not require any treatment at all. Most often, oral rehydration therapy is recommended. However, patients with fever and dysenteric stool may be given an appropriate antibiotic. In the absence of culture facilities for *Campylobacter*, patients (especially those aged under five) with a negative report for *Shigella*, *Salmonella*, *E. histolytica* and *G. lamblia*, but with a microscopic stool picture of invasive diarrhoea, with abdominal pain, may be suspected of having *Campylobacter* enteritis.

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