Bacterial gastroenteritis in Saudi children


ABSTRACT

Objective: Incidence of bacterial enteric pathogens among Saudi children below the age of 10 years.

Methods: Fifty thousand and four hundred stool samples were retrospectively investigated for bacterial pathogens from January 1988 to December 1996. The infected children were divided into 3 age groups. All enteropathogens were identified by conventional methods, Api 20E and sero agglutination test.

Results: A total of 3123 (6%) positive stool specimens were identified during that period. Of these positives, 2791 (99%) were stool samples received from out-patients. Salmonella food poisoning species were dominant pathogenics organisms (56%) followed by Campylobacter species (28%) and Shigella species (15%).

Conclusion: Food born infection is common in Saudi children and is likely to be associated with food hygiene. Antimicrobial resistance was found to be common amongst the Salmonella and Shigella isolates. Treatment of infected patients if indicated, should be guided by the in-vitro susceptibility testing.

Keywords: Childhood gastroenteritis, bacterial etiology, susceptibility pattern.

Gastro-enteritis is a major worldwide disease. It is one of the leading causes of morbidity and mortality. The worldwide annual incidence of diarrheal episodes 5 billions with 5-10 million deaths each year in developing countries alone.1 Pediatric cases represent 40-60% of cases of diarrheal2. Causative agents of infectious diarrhea include bacteria, viruses, protozoa and helminths. The etiology differs from geographic area to another. In industrial countries, rotaviruses have been shown to be the most common entero-pathogens.3 The incidence is less in developing countries, while the bacterial agents cause most of the diarrheal diseases in these countries.4

The most common bacterial causes of infectious diarrhea in children are Salmonella, Shigella and Campylobacter species.5

The fecal oral route is the main mode of transmission. Contaminated water and food products are implicated occasionally. Animals are an occasional mode of spread for both Campylobacter and Salmonella.

In this paper, we describe a 9 year retrospective study at Riyadh Armed Forces Hospital (RAFH), Saudi Arabia, indicating that infection with this food born organisms is common in Saudi children and is likely to be associated with food hygiene. Antimicrobial resistance was found to be common amongst the Salmonella and Shigella isolates. Treatment of infected patients if indicated should be guided by the in-vitro susceptibility testing.

Methods. A retrospective study was carried out between January 1988 and December 1996. A total

From the Department of Microbiology, Central Military Laboratory & Blood Bank, Riyadh Armed Forces Hospital, Riyadh, Kingdom of Saudi Arabia.

Received 11th July 1998. Accepted for publication in final form 19th April 1999.

Address correspondence and reprint request to: Dr. Saadia M. Bakheshwain, Department of Microbiology, Central Military Laboratory & Blood Bank, Riyadh Armed Forces Hospital, PO Box 7897, Riyadh 11159, Kingdom of Saudi Arabia. Tel. 477 7714 Ext. 4453. Fax. 478 3033.
of 50400 stool specimens were examined during this period. Three thousand one hundred and twenty three (6%) positive stools were identified out of which 99% were from outpatients.

The specimens were examined macroscopically for consistency, presence of mucus or blood. All specimens were inoculated onto desoxycholate-citrate agar (DCA), xylose lysine desoxycholate agar (XLD), Campylobacter blood free media, horse blood agar for children less than 3 years and selenite broth. Campy plates were incubated at 42°C under microaerophilic conditions for 48 hours. All other media were incubated at 35°C for 18-24 hours. Selenite broth was subcultured onto XLD after 18-24 hours and incubated at 35°C for 18 hours.

All enteropathogens were identified by conventional methods and API 20E (Biomerieux, France). Sero grouping was performed by using antisera from Wellcome Diagnostic (Dartford, England). Campylobacter was identified by its growth requirement, motility, oxidase, cultural and microscopical appearance.

Antibiotic sensitivity for Salmonella and Shigella isolates, was performed by the modified stokes method testing 7 antibiotics ampicillin, septrin chloramphenical, nalidixic acid, ciprofloxacin, cefuroxime and ceftriaxone.

Antibiotic sensitivity for Campylobacter is not carried out routinely in the lab.

All stool specimens were examined microscopically for the presence of ova and parasite by direct wet preparation and an iodine smear.

**Results.** Of the 50400 specimens processed, 3123 were positive (6%) for entero-pathogenic bacteria (Table 1), isolated from 2640 patients. Salmonella accounted for (56%) of all bacterial pathogens isolated, with (35%) serogroup B (Table 2). Campylobacter species was the second most frequently isolated bacteria (28%). Shigella species accounted for (15%) of isolates followed by Aeromonas and Vibrio (1%) in symptomatic patients. Enteropathogenic E. Coli accounted for (0.2%) of the bacterial isolates.

Table 3 shows the incidence of bacterial isolates according to the age group, with highest incidence of infections occurring in the pre-school age (1-5yrs).

The resistance pattern obtained from Salmonella and Shigella isolates are shown in Table 4.

**Discussion.** It is impossible to evaluate the true incidence of bacterial gastro-enteritis in this or any other area of the world because many cases do not present for investigation.

The main finding in this study was the relatively high incidence rate of acute diarrheal disease in this community.
In developing countries, most of the diarrheal infections appear to be caused by bacteria and protozoa. At RKH bacterial etiology was (6%) of 50400 specimens investigated. *Salmonella* being the most frequent (56%) followed by *Campylobacter* (27%) and *Shigella* (15%). Our findings are similar to previous reports from Riyadh, Qadri et al. and Al Bawardy et al.7

Previous studies from Riyadh by Robertson and Al Rasheed showed lower *Campylobacter* isolation rate (8%) and (3%), another report from Israel showed similar results (1%) which indicate either improved laboratory techniques or increased incidence of *Campylobacter* infection among children.

A study from Libya showed a (6%) of *Shigella* species isolates among children aged from a few days to 3 years.

In Ethiopia, Thailand, Brazil and Mexico, *Shigella* is the most common pathogen whereas *Campylobacter* predominates in Central Africa. Antimicrobial resistance was found to be common amongst the *Shigella* isolates with (50%) resistance to Ampicillin and (53%) resistance to Chloramphenicol. These indicate antibiotic abuse. *Salmonella* isolates showed relatively lower incidence of resistance (15.5%) with Ampicillin compared to previous result from Jeddah (23%). Acronomas, *Vibrio* and *E. Coli* isolates were fully sensitive to antibiotics tested in this study, they were not included in Table 4 because of the small number of the cases.

It must be stressed that most of the bacterial gastro-enteritis is usually a mild uncomplicated disease which should not be treated with antibiotics. In the rare instances of sepsis or secondary infection, antimicrobial chemotherapy should be guided by susceptibility testing.

In conclusion, food-borne infection is common in Saudi children and is likely to be associated with food hygiene. *Salmonella* food poisoning species were dominant pathogenic organisms followed by *Campylobacter* and *Shigella* species. Antimicrobial resistance was found to be common among the *Salmonella* and *Shigella* isolates. Treatment of infected patients, if indicated, should be guided by *in vitro* susceptibility testing.

References